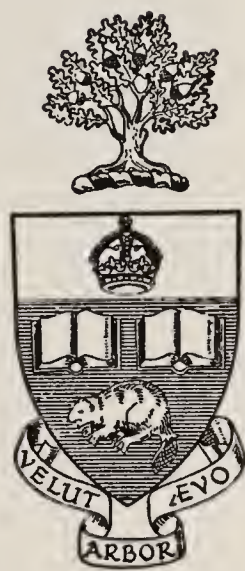


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UNIVERSITY OF TORONTO



REPORT OF THE DEAN
OF THE
FACULTY OF MEDICINE

Session 1971-1972

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Report of the Dean of the Faculty of Medicine



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THE DEAN OF THE FACULTY OF MEDICINE

The 1971-72 session is noteworthy in the history of this Faculty for many reasons, one of the outstanding being the 50th Anniversary of the Discovery of Insulin by Drs. Banting and Best. This occasion was marked by a Special Convocation at which honorary degrees were conferred on a number of scientists from Canada, the United States and Europe who had played a major role in the development of Insulin or its application to the treatment of diabetes. A Symposium on Insulin by international authorities, under the chairmanship of Dr. I.B. Fritz, was arranged to coincide with the convocation ceremonies and the Gairdner Foundation Awards likewise were integrated into a most impressive scientific occasion. Dr. C.H. Best was present and took part in the ceremonies. A bronze portrait of Dr. Best as one of the co-discoverers of Insulin was unveiled in the Hall of the Medical Sciences Building.

The newly constituted representative Council of the Faculty began to function in the fall of 1971. Some delays were experienced before its committee structure became fully effective in the new year. Despite its short existence its record of achievement has been significant.

In December the Faculty's organization and operation were reviewed by two accreditation bodies, the Liaison Committee on Medical Education (a joint body of the Association of Canadian Medical Colleges and the Association of American Medical Colleges) and the Royal College of Physicians and Surgeons of Canada. In general the reports were satisfactory though they indicated some areas where improvements could be made. Because of the very recent reorganization of the Faculty Council, the adoption of a new curriculum and impending changes in hospital construction, they expect to review this Faculty again in the next two or three years.

In September the Minister of Health commissioned a Role Study of four of the main teaching hospitals, the Toronto General, Toronto Western, St. Michael's and Sunnybrook, to determine their function in providing patient care and educational services to the community and the facilities which would have to be financed to meet these needs. The report, which has received government support in principle, recommends the formation of four semi-autonomous clinical schools. The Long Range Planning Committee of the Faculty has prepared a similar report but its proposals have not yet been debated by Faculty Council.

A subcommittee of the Ontario Council of Health dealing with Future Arrangements for Health Education recommends that much of the undergraduate medical education should be conducted in the community, that is, in health centres and satellite units rather than in large city hospitals as at present. The subcommittee also suggests that enrolment in the existing medical schools should be increased instead of building new medical schools to meet the medical manpower shortage. For this University it recommends that the entering class be enlarged from 250 to 350. Another major report sponsored by the government, on postsecondary education, suggests many sweeping changes in the operation and financing of universities, including the professional faculties. Yet another government agency, the Ontario Hospital Services Commission, which has been responsible for major financial support of clinical teaching services, now questions the appropriateness of its involvement in financing medical education.

In the light of these multiple studies and reports, or rather in the absence of illumination as to the ultimate intentions of the government, planning even for the immediate requirements, to say nothing of the distant needs, appears to have little solid base on which to build. Because of the very long lead time necessary to produce appropriately trained health personnel it is to be hoped that some firm government commitments will soon make it possible to develop a coherent plan of action with some sense of stability for a reasonable period into the future.

Despite uncertainties some preliminary attempts to respond to newer concepts of the delivery of health care have been made. The Department of Paediatrics, in association with the School of Nursing, has instituted a Nurse Practitioner Course. The Department of Family and Community Medicine is setting up a number of teaching practices. It is anticipated that some of these will develop into comprehensive health care centres for ambulatory patients by the addition of other health workers. The Faculty is also participating in a University-wide committee studying the question of education of health personnel in relation to the needs of health care delivery.

There have been a number of important changes of staff. Dr. Fred Kergin, Associate Dean, Clinical Sciences, and formerly Chairman of the Department of Surgery, has retired after a lifetime of devoted service to this Faculty and the University. This post has been ably filled by Professor Brian Holmes, Chairman of the Department of Radiology. We have also been fortunate that Professor George Connell, formerly Chairman, Department of Biochemistry, has accepted the post of Associate Dean, Basic Science, which has been vacant for the past two years. We are happy to welcome back Professor K.J.R. Wightman, Associate Dean of Postgraduate Medical Education, from sabbatical leave in Paris. Professor William Drucker, Chairman of the Department of Surgery, has accepted the Deanship of the Medical School at the University of Virginia; he will be succeeded by Professor Donald R. Wilson, who will retain his appointment as Surgeon-in-Chief at the Toronto Western Hospital. Professor A. Jousse, Chairman of the Division of Rehabilitation Medicine since shortly after its inception, is relinquishing the chairmanship to Professor John Crawford of the Toronto Western Hospital. It is because of the efforts of such devoted physician-educators that this school continues to be recognized as one of the outstanding schools of medicine.

The Faculty also takes pride in the fact that one of its graduates, Dr. John R. Evans, has returned to the University as its new President. It extends a word of sincere appreciation also to Acting President John Sword who has guided the University through some stormy seas.

Visitors

During the academic session many prominent physicians and scientists visited the Faculty. These included:

Department of Anaesthesia: Professor Torsten Gardh of the Karolinska Institute of Stockholm, who gave the Thirteenth Dr. Harry Shields Lecture; Professor Francis Foldes, Albert Einstein School of Medicine, Yeshiva University, New York City, who gave the Second Murray Mendelson Memorial Lecture; Professor N.P. Singh, Pondicherry, India; Dr. W.W. Mapleson, Cardiff; Dr. Alastair A. Spence, Glasgow; Professor James Payne, England; Professor James Parkhouse, Manchester; Dr. Andrew Hunter, Manchester; Professor Philip Bromage, McGill University; Professor Gordon Wyant, Saskatchewan; Professor Stuart Vandewater, Queen's University; Dr. Evan Hallett, Adelaide, Australia.

Department of Anatomy: Dr. R.A. Steeves, Buffalo; Dr. S. Vesselinovitch, Chicago; Dr. Takeshi Odaka, Tokyo; Dr. Shozo Irino, Okayama, Japan; Dr. Hans F. Stich, Queen's University; Dr. Maden Joneja, Queen's University; Dr. G. Barski, Villejuif, France; Dr. E.A. MacKinnon, Queen's University; Dr. D.B. Stoltz, Austin, Texas; Dr. I.H.M. Smart, Dundee; Dr. G.E. Erikson, Brown University; Dr. Boris Konkuov, Moscow; Dr. Maurice Marois, Paris.

Department of Behavioural Science: Dr. R.L. Alfonso, Manila, Philippines; Professor Odin W. Anderson, Chicago; Dr. Jaime Breil, Quito, Ecuador; Professor Fred Davis, San Francisco; Professor M.G. Field, Harvard University; Dr. Juan C. Garcia, PanAmerican Health Organization; Professor G. Gibson, Buffalo; Dr. W.G. Goldthorpe, Sioux Lookout Zone Hospital; Professor Saxon Graham, Buffalo; Professor

Cristina L. Guedes, Belo Horizonte, Brasil; Dr. Basil S. Hetzel, Australia; Professor C.E. Hopkins, Los Angeles; Professor R. Illsley, Aberdeen; Professor H. Ladd, Loyola University; Professor R. Landes, McMaster University; Dr. Carlos A. Linger, Buenos Aires; Dr. Nina P. Nunes, Rio de Janeiro; J.M. Reid, M.P., Rainy River-Kenora; Dr. Magdalena Sokolowska, Warsaw; Dr. Ian Tait, Aldeburgh, U.K.; Professor Cesar A.B. Vieira, Belo Horizonte, Brasil; Dr. Hannu Vuori, Helsinki; Dr. Samuel Wolfe, Meharry Medical College.

Department of Ophthalmology: Dr. Goodwin Breinin, New York University Medical Center, who gave the Fourteenth Walter Wright Lectureship; Dr. R. Troutman, New York; Dr. A. Bron, London; Dr. Claes Dohlman, Boston; Dr. Ben Fine, Armed Forces Institute of Pathology, Washington, D.C.; Dr. S. Zigman, Rochester, N.Y.; Dr. Michel Mathieu, Université de Montréal.

Department of Otolaryngology: Professor Hans Engstrom, President of the Barany Society.

Department of Paediatrics: Dr. U. Shehu, Zaria, Nigeria; Dr. R.W. Townley, Melbourne; Dr. Ernest McCoy, Edmonton; Dr. M.P. Keet, Karl Bremer Hospital, South Africa; Dr. Wen-Chieh Chen, Peking; Dr. Jen-Liu Yao, Chinese Embassy, Ottawa; Dr. Charlotte M. Anderson, Birmingham; Dr. Albert Royer, Montreal; Dr. J. Rennie Marshall, Tidworth, England; Dr. Irwin M. Arias, New York; Dr. Richard H.R. White, Birmingham; Dr. Harry Medovy, Winnipeg; Dr. Antonio Diez, Havana; Dr. Heriberto Modero Pio, Havana; Dr. Joaquin Pascual Gispert, Havana; Dr. Reginald Lightwood, Drogheda, Eire; Dr. E. Gautier, Switzerland; Dr. F. Rey, Paris; Dr. David Fearon, Melbourne.

Department of Pharmacology: Dr. Douglas R. Waud, Harvard Medical School; Dr. Lloyd Beck, Ottawa; Dr. Roger H. Bowman, Syracuse, N.Y.; Dr. Gerhard Levy, Buffalo; Dr. N. Robbins, Case Western Reserve University; Dr. Paul Domenech, University of Chile; Dr. David Colquhoun, Yale University; Dr. B.R. Nechay, Galveston, Texas; Dr. L. Magos, M.R.C. Toxicology Unit, Carshalton, Surrey.

Department of Physiology: Dr. Eugene D. Jacobson, Texas; Dr. Sergio A. Ben- cosme, Queen's University; Dr. David Colquhoun, Yale University; Dr. Horst Kern, University of Heidelberg; Dr. Piero P. Foa, Detroit; Dr. R.H. Lowry, Defence and Civil Institute of Environmental Medicine, Toronto; Dr. Paul Domenech, University of Chile; Dr. Horacio E. Cingolani, La Plata University, Argentina; Dr. R.B. Stein, Edmonton.

Department of Radiology: Dr. Janet Dacir, London; Dr. Maurice Dufresne, Université de Montréal; Dr. Robert Fraser, McGill University; Dr. Walter Fuchs, Université de Berne; Dr. G. Gill, McMaster University; Dr. D. Gough, Belfast; Dr. John Gwinn, University of California; Dr. H.W. Ha, Peking; Dr. Jack Haye, Basel, Switzerland; Dr. C.J. Hodson, Memorial University; Dr. Thure Holm, University of Lund, Sweden; Dr. R. Hoy, Pittsburgh; Dr. Peter Hicken, Birmingham; Dr. Everette James, Johns Hopkins Medical School; Dr. K. Jonsson, Sweden; Dr. S.B. Lagundaye, University of Ibadan, Nigeria; Dr. H. Lake, Melbourne; Dr. L. Masjuan, Madrid; Dr. Lynne Reid, London; Dr. D.G. Wollin, Kingston.

Department of Surgery: Mr. A.S. Aldis, Cardiff; Dr. W.B. Bean, University of Iowa; Dr. David Blemenstock, Columbia University Medical School; Professor J.C. Callaghan, University of Alberta; Dr. R.E. Carroll, New York; Dr. W. Carter, Ballarat, Australia; Mr. C.T. Collins, New Zealand; Dr. Harvey Crystall, University of Southern California; Dr. M. De Benedetti, California; Dr. E. Eikelaar, Grescinger, Holland; Dr. A. Escobar, University of Mexico; Dr. H.C. Grillo, Boston; Mr. A.J.

Gunning, Nuffield Foundation Research Institute, Oxford; Dr. Hsien-Wen Ha, Peking; Mr. Malcolm Hay, Birmingham; Dr. J.R. Hicks, Charlotte, N.C.; Dr. C.A. Hiebert, Tufts University; Dr. Hoogmarten, Belgium; Mr. O.J. Vaughan-Jackson, Memorial University; Professor A.W. Kay, Glasgow; Dr. H.E. Kleinert, University of Louisville; Dr. C.M. Leevy, New Jersey; Dr. P.A. Limbers, Sydney; Mr. W.A.A.G. Macbeth, Dunedin, New Zealand; Dr. W.P.G. Main, London; Dr. R.M. McFarlane, University of Western Ontario; Dr. Angus McLaughlin, University of Western Ontario; Dr. Rene Megavard, Switzerland; Dr. L.W. Milford, Jr., University of Tennessee; Dr. Henry Miller, University of Durham; Dr. C.B. Mueller, McMaster University; Dr. D.D. Munro, Montreal; Dr. V.L. Nickel, University of Southern California; Dr. A.J. Phillips, Canadian Cancer Society; Dr. J.C. Randolph, Washington, D.C.; Professor Andrew Roger, University of Oxford; Dr. H.W. Scott, Jr., Nashville; Dr. Thomas Sears, London; Dr. Michael Sullivan, London; Dr. Sidney Sutherland, Melbourne; Dr. F.J. Veith, New York City; Dr. Paul Branch, Louisiana; Dr. Dillwyn Evans, Cardiff; Dr. John Golding, Jamaica; Dr. J.E. Hall, Boston; Dr. Vert Mooney, University of Southern California; Dr. C.S. Neer, New York; The Academic Plastic Surgery Forum; The Academy of Orthopaedic Surgeons of France; The Harvenian Society.

Institute of Medical Science: Dr. E.L. Becker, University of Connecticut; Dr. I.S. Edelman, University of California; Dr. E. Glaz, University of Budapest; Dr. P. Gold, McGill University; Dr. L. Harris, Harvard University; Dr. C. B. Mueller, McMaster University; Dr. J.M. McKenzie, McGill University; Dr. F. McMorris, Yale University; Dr. D. Sackett, McMaster University; Dr. A.N. Siakotos, Indiana University; Dr. M.D. Siperstein, University of Texas; Dr. W. Taylor, University of Chicago; Dr. P. Cole, Harvard University.

I should like to thank the Medical Alumni for their continued support of our student bursary, scholarship and training programme.

Finally, I should like to thank all those who by their donations have so generously supported our fellowship, scholarship and research programmes.

Research

Abbott Laboratories Limited; Alcoholism and Drug Addiction Foundation; American Medical Association; The Atkinson Charitable Foundation; H.M. Austin Estate; Banting Research Foundation; Charles H. Best Foundation; J.P. Bickell Foundation; J.W. Billes Estate; Lillian Mary Black Estate; N.B. Brennan Estate; Burroughs, Wellcome and Company (Canada); Canadian Arthritis and Rheumatism Society; The Canada Council; Canadian Cystic Fibrosis Association; Canadian Diabetic Association; Canadian Heart Foundation; Canadian Hepatic Association; Canadian International Development Agency; Canadian Life Insurance Association; J. Clemens Estate; The Commonwealth Scholarship Commission; The Charlie Conacher Fund; The Connaught Medical Research Laboratories; The Crusade Against Leukemia; The James H. Cummings Foundation; The Defence Research Board; Denison Mines Limited; Department of Health (Provincial); Department of National Health and Welfare; The J.S. Dickson Estate; The Fraternal Order of Eagles, Maple Leaf Aerie 2311; Eaton Endowment Account; T. Foster Estate; Carey E. Fox Foundation; The Anna Fuller Fund; P.R. Gairdner Foundation; Geigy (Canada) Limited; Flora C. Gray Estate; The J.F. Hartford Foundation; Hoechst Pharmaceuticals; The Nelson Arthur Hyland Foundation; G. I'Anson Estate; I.G. Ingle; Insulin Trust Fund; M.B. Kerbel Ophthalmological Foundation; Eli Lilly Company; R. Samuel McLaughlin Foundation; The McLean Foundation; Medical Research Council of Canada; Merck and Company Incorporated; Millbank Memorial Fund; The Muscular Dystrophy Association; National Academy of Science; National Cancer Institute of Canada; National Research Council; National Sanatorium Association; Ontario Cancer Treatment and Research Foundation; Ontario Heart Foundation; Ontario Hospital Services Commission (Eye Bank); Ontario Mental Health Association; Ontario Tuberculosis As-

sociation (Ontario Thoracic Society); The Independent Order of Odd Fellows; Pfizer Company Limited; James Picker Society; The J. Helen Playfair Foundation; P.S.I. Foundation; The Rebekah Assembly of the I.O.O.F.; The Ethel Rogers Estate; The Selkirk Fund; C.D. Serle and Company Canada Limited; Dr. M. Shea; I.E. Smith Fund; C. Smythe Fund; The Stapells Research Foundation; M. Treneman Estate; Tuberculosis and Respiratory Disease Association; United States National Institutes of Health; W. Garfield Weston Charitable Foundation; The Workmen's Compensation Board.

A.L. CHUTE

REPORT ON REGISTRATION, SESSION 1972-1973

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Diploma in Clinical Chemistry	4
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Diploma in Psychiatry	16
Other Postgraduate Students (Internes, Residents, and Fellows)	1,106
	<hr/>
	2,353

FELLOWSHIPS, SCHOLARSHIPS, MEDALS AND PRIZES

GRADUATE

Ursula E. Bangs, I.O.D.E. Fellowship	B. Morton
Irving Heward Cameron Scholarship	T.S. Lau
Graham Campbell Prize	J.A. McClure
Caven Memorial Fellowship	S. Carlsen
Chisholm Memorial Fellowship	D.A. Gornall
Robert Edward Gaby Awards	M.S.G. Bell
	W.G. McCain
William Goldie Prize	R. Volpé
Roscoe Reid Graham Travelling Fellowships in Surgery	J.M. Nelems
	K.W. Johnston
Stuart Alan Hoffman Memorial Prize	V. Lustig
Arch Hutchison Fellowship	J.O. Roos
Frances Esther Hutchison Fellowship	J.O. Roos
Inez Gwendolyn Inglee Scholarships	I. Robertson
	U. de Boni
Minister of Health Gold Medal in Psychiatry	E.M. Waring
James H. Richardson Research Fellowship	A. Roberts
Anna Bradbury Springer Award	L. Katz
F.N.G. Starr Memorial Scholarship	J. Hamilton Hall
Starr Medal	M. Halperin
Edward Christie Stevens Fellowships	M.A. Sun
	H. Kwan
	A.W. Dennis
John Alexander Stewart Fellowships	S. Dhadli
	J.O. Roos
Helen L. Vanderveer Fellowship	W.S. Hwang

UNDERGRADUATE

Fourth Medical Year

Cody Gold Medal	Mrs. A.R. Rachlis
Cody Silver Medal	D.J. Nerenberg
Cody Silver Medal	L. Robicsek
J.P. Boley Prize in Ophthalmology	F. Gentili

Irving Heward Cameron Undergraduate Scholarship	B.R. Thomson
Kathleen Chambers Memorial Award	Mrs. B.J. Richardson
Chappell Prize in Clinical Medicine	V. Rachlis
Dr. Jacob Goldstein Scholarship	F. Rosenberg
R.I. Harris Undergraduate Award	W.J. Peters
Hendry Memorial Scholarship	Mrs. B.J.E. Taylor
Frank W. Horner Gold Medal	Miss M.C. McPhail
Issei Scholarship in Medicine and Surgery	B.R. Thomson
Dr. Louis Kagan Memorial Award	F. Gentili
Dr. Mitchell Kohan Scholarship	Mrs. A.R. Rachlis
Medical Alumni Association Scholarship	D.J. Nerenberg
Ellen Mickle Fellowship	Mrs. A.R. Rachlis
Dr. and Mrs. M.A. Pollock Award	L. Robicsek
Dr. Roy Simpson Scholarship in Paediatrics	M.P. Chatterson
Samuel J. Streight, O.B.E., M.D., Scholarship in Internal Medicine	H.L. Price

Third Medical Year

Bristol Laboratories of Canada Prize	P.A.J. Finnegan
Dr. F.J. Colling, O.B.E., Memorial Scholarships	J.P. Baker
renewals:	M.B. Ginsberg
	R. Hyland
	Mrs. R. Moses
	E. Urovitz
	B. Wisenberg
William Edward Corlett Memorial Scholarship (renewal)	I.D. McLean
Franckel Memorial Award	R. Ilves
Gangbar Memorial Prize	J.F. Kellam
Ontario Medical Association Prize in Preventive Medicine	D.L. Shulman
Dr. C.S. Wainwright Memorial Scholarships	D.P.E. Schiff
renewals:	F.J. Taylor
	J. Barclay
	R.F. Grossman
Walter F. Watkins Scholarships	Miss E. J. Campbell
	R. Ilves
	J.F. Kellam
	J.D. Ledger
	F.P. Mandel
	G.D. Pristupa
	P.S. Tepperman

Second Medical Year

Dr. F.J. Colling, O.B.E., Memorial Scholarships	H.R. Cohen
	B.C. Douglas
	Mrs. K. Fiala
	D.W.M. George
	J.H. Green
	Miss C.M. Jones
	D.R. Parkinson
	D.M. Shrives
	J.W. Sussman
John Copp Bursary	M.D. Minden
Charles E. Frosst Medical Scholarships	W.K. Cheng
	S. Gordner
	R.A. MacLachlan
	Miss D.M. Saull
	S.L. Wolman
Dr. Thomas Arnold McCormick Scholarship	W.B. Soutar
Dr. C.S. Wainwright Memorial Scholarships (renewals)	R.J. Bowers
	B.J. Goldlist
	G.R. Harrigan
	S.C.T. Lam

Walter F. Watkins Scholarships	Miss K.T. Alimburka R.A. Davies R.S. Davies B.H. Dingle C. Erlichman J.W. Frank L.W. Horenblas J.E. Kudlow J.T. Simpson Mrs. J. Verbeeten
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First Medical Year

J.F. Hartz Company Prizes	M.M. Flaum Miss D.M. Ward
Posluns Brothers Scholarship	I.D. Gibson
Dr. C.S. Wainwright Memorial Scholarships .	Miss P.A. Arnup L.K. Direnfeld S. Fine I.D. Gibson J.S. Halpenny S.C.P. Ho
Major William McLean Walwyn Awards (renewals)	A.M. Legge D.G. White
Walter F. Watkins Scholarships	J.M. Bordman Miss M. Doyle J.C. Drummond A.E.T. Lang Miss M.A. McPhail M.K. Matthews W.S. So J.C.H. Tam B.S. Tepperman M.W. Wu P.A. Zuliano
John Zoberman Scholarship	S.S. Schachter

DIVISION OF POSTGRADUATE MEDICAL EDUCATION

Under the direction of Professor K.J.R. Wightman

The first event of the year was the Advanced Graduate Course in Medicine, Surgery and Obstetrics, during the summer. In 1971 a number of innovations made the course a good deal more interesting and provided a varied fare for the registrants. These included such things as the provision of tape-recorded lectures, tape/slide presentations which were available in study carrels, visual exhibits of various sorts, X-ray displays, pathology specimens, moving pictures, and most important of all, perhaps, an opportunity to have an informal discussion with teachers during the lunch hour. The general quality of the lectures was very high. An evaluation procedure was carried out by the registrants in the course, and analysed by Dr. John Flowers. In general, the rate of co-operation on the part of the observers was very high and their comments, although mainly favourable, were helpful. A very large volume of hand-out material was reproduced and distributed in the Division, and the demands on the staff were very heavy. The audiovisual portion of the course was supervised mainly by Dr. Charles Alter and Dr. Flowers.

Immediately after this course, the Director went to Paris on study leave. The affairs of the Division were then managed by Professor H. S. Gear and Mrs. C. Flinn, the programme director, until the end of March. During this period, the Division assisted the various departments in offering a number of courses for both specialists and family practitioners. In all, these numbered thirty (30), and attracted two

thousand, two hundred and forty-two (2242) registrants. Television was used to a considerable extent to permit the visualization of operative procedures, etc. in some of these courses. The assistance of the Division of Instructional Media Services is gratefully acknowledged.

These courses vary a good deal in their format, but in every case an effort is made to encourage the registrants to become participants in the true sense of the word, and an opportunity is given them to discuss matters from their own point of view. Much of the material was taped, partly to see if it could be modified in such a way as to be suitable for distribution to members of the profession who could not attend. The Division is receiving some support from the Medical Alumni Association for this purpose, and is acquiring experience in this popular field. Dr. Alter is responsible for this activity.

The Programme of Decentralized Clinics in hospitals outside Toronto is also active and is expanding. During the year, thirty-three (33) members of the university staff participated in eight (8) communities, making visits lasting anywhere from one day to a week. In the main, these programmes centre about patients presented by the local doctors, which then serve as a springboard for general discussion of the topic exemplified. The most ambitious of these affairs was a visit by six members of staff to Timmins for a day and a half, for discussing various aspects of "Trauma." More than fifty (50) doctors from the three adjoining medical districts attended, and the discussion was very profitable.

In the same connection, the staff of the Department of Anaesthesia has instituted a series of visits to community hospitals designed to study what the local anaesthetists are doing, and to provide information that will be useful to them in a setting where they are accustomed to work. The visitor tries to assess the areas of information that will be most helpful, and by watching the men at work each morning for a week, can decide what topics to discuss in a seminar setting later in the day. At the same time, he is able to examine the equipment available, and make recommendations to the staff and the hospital administration regarding the practice of anaesthesia in that particular institution. So far, this service has been requested by five (5) hospitals, and supported by funds donated to the Division by the Ontario Medical Association. No charge has been levied on the hospital or its staff.

The responsibility of the Division for the postgraduate education of residents and internes has heretofore been almost entirely an administrative one. However, this year the Centre was visited by a rather extensive team of appraisers acting on behalf of the Royal College of Physicians and Surgeons of Canada. In their reports they urged strongly that the Division be given a more active role in co-ordinating and monitoring the programmes going on in the various hospitals and departments, which number in total something like sixty-five (65). This year one thousand, one hundred and eighty-three (1183) students were registered, including fellows of various sorts, which is about double the number registered five years ago. Courses of lectures were arranged through the Division for trainees in the various departments and in many instances, the postgraduate students were encouraged to attend continuing education courses.

It is hoped that we will be able to pay more and more attention to some of the pedagogical problems of continuing education, particularly in the line of discovering more accurately what the doctors need to learn, and in seeing what is the best method of teaching them. The knowledge explosion of recent years is counterbalanced by an ignorance explosion in the case of those men who have been so preoccupied with their day-to-day activities as to be completely unaware of some of the recent progress in certain fields. It seems entirely likely that we shall have to assume an increasing responsibility for ensuring that maximum opportunity is given to the members of the profession to keep up to date, and to see that the efforts of the clinicians who undertake this type of teaching are used as economically and as effectively as possible.

In April, Sir John McMichael visited the Division and conducted two seminars with members of the Postgraduate Committee and representatives of the various departments who are mainly concerned with postgraduate and continuing education.

During his visit, he discussed the work being done by the Postgraduate Medical Federation in London, and discussed problems of mutual interest with the people here.

During this year, a new Constitution of the Faculty came into effect with the appointment of a Committee on Postgraduate Education under the chairmanship of Dr. H. Stancer, with Sub-Committees on Awards (Dr. Harwood-Nash), Curriculum (Dr. V. Rakoff), and Admissions (Dr. I. Koven). As the end of the year approaches, these groups are getting their teeth into the problems of the Division, and one looks forward to further progress and development under their guidance.

During the year, the divisional staff has had heavy demands made on it, involving many hours of overtime work. They have always risen to the occasion and I would like to express my gratitude to them, particularly to Mrs. Flinn, in view of the heavy load of responsibility she was carrying during my absence.

DIVISION OF INSTRUCTIONAL MEDIA SERVICES

Under the direction of Dr. J.K. Conway

Operations in the Division this year have been characterized by expansion of user demand, in most instances exceeding earlier liberal estimates of the year's performance. It has been previously noted that the Division's services parallel the development of curricula and other educational activities. Growth in the Division relates to the consolidation of these activities within the framework of a new building and to advertisement of the scope and quality of services available for teachers. The greatest single impediment to increased instructional media use is not teacher negativism, but lack of awareness of the local resources that can be drawn upon when required. Beginning attempts at heightening this awareness have proved to be successful and will be continued in the next year.

Photographic Section

This area of the Division's operations has continued to show a consistent and large increment in user demand. The volume of requests for all varieties of photographic services has, on the average, increased 20–25 per cent over last year. Local availability, speed and efficiency of service, and high quality of the end product are factors affecting growth of the service load.

Television and Film Section

A phenomenal growth pattern has characterized this section over the past year and a half. Of the four sections of the Division, it only can undertake the production of combinations of media approaches (television, film, tape/slides, audio and video cassettes, etc.). As a consequence, the section is the focus for the production of all forms of educational materials for users in all Health Science divisions of the University, in the teaching hospitals, and generally in the Toronto-wide health sciences community. A close to 50 per cent increase in requests has stretched the small production staff to the limits of its capacity. The success of the year has affirmed the wisdom of having a competent media producer as the central resource of this most technologically sophisticated area of media activity.

Art Section

A small disturbance of operations was suffered in this section when it moved over to the Medical Sciences Building midway through the year. However, the positive effects of the move were beginning to be felt as the year closed. Ease of access by Medical Sciences Building users, integration with other service functions, and administrative efficiencies contributed to later improvements of section operations.

Projection Section

A 20 per cent increase in requests over last year's heavy demand was assimilated without major difficulty. This increase is primarily attributable to expanded use of Medical Sciences Building lecture-room facilities by teachers outside of the Faculty of Medicine.

For the first time the section undertook to provide projection services for health science conferences outside the Medical Sciences Building. Prior to this year it had limited its service in this respect to areas of responsibility within the building.

DIVISION OF LABORATORY ANIMAL SCIENCE

Under the direction of Dr. L.R. Christensen

The Animals for Research Act

This Act, designed to establish standards for animal care and use in research and make unwanted pound animals available for research, has been in effect for over a year and it is now possible to evaluate its effects on biomedical research in the University. No significant difficulties have been experienced in complying with the Act although a number of repairs and renovations have been made to comply with the regulations. It is a pleasure to record that government representatives have been most co-operative and helpful in solving the problems that have arisen. The supply of unwanted dogs from pounds under the Act has been adequate for our needs and no problems have developed. An unexpected benefit of the new law has been derived from the more detailed pound records now required. As a result we have been able to identify and return to their owners several dogs in the past year.

Under the law, only animals impounded under a municipal by-law are available for research. While most municipalities have by-laws respecting dogs, few have a similar law for cats. This has resulted in considerable difficulty in obtaining sufficient cats for investigators' needs and on several occasions it has been necessary to obtain cats from the United States.

Pound personnel are showing an active interest in improving animal care in their pounds and the Division is frequently consulted for advice on problems of management, disease, and general care. It appears that mutually beneficial co-operation is being established between the University and the pounds.

Animal Facilities and Use in DLAS

The tightening of research funds in the past year or two is beginning to be reflected in animal use. There has been a decrease of about 10 per cent from last year in the sums spent for animals. Most Canadian institutions are experiencing similar declines in animal use, some reporting even larger drops. Nevertheless, a total of about 96,000 animals were used. Rodents made up 92,500 of this total.

In view of the concern about use of dogs in research expressed by some people, it is noteworthy that less than 1.5 per cent of the animals used were dogs and that this ratio is somewhat less than in previous years. An increasing variety of species is being used and planaria, mud puppies, goldfish, and baboons have found their way into our facilities.

The use of centralized surgical facilities, as projected in the original planning of DLAS, has not materialized. Accordingly, the technical staff in surgery has been reduced from three to one, with a consequent curtailment in the extent of the services that can be provided. However, the physical facilities themselves are still among the best in Canada.

Education Programmes

The Division continues to be heavily involved in animal technician training programmes. Dr. Fletch was Programme Director for CALAS courses given here and at Guelph this year. As a result of this programme, an additional four members of the DLAS staff obtained Animal Technician Certificates this year.

A number of community colleges have initiated programmes designed to prepare students for careers as technicians, including animal technicians. The Division co-operates with these schools in providing on-the-job experience by employing students as summer help.

One of the municipal pounds requested the Division to provide instruction on vaccination. Accordingly, Dr. Fletch organized a short course, given in the Division facilities, on the principles of immunization. This was followed by workshop sessions at the pound to familiarize the personnel with actual vaccination techniques.

Mr. Reid continues to serve as Chairman of the CALAS Technician Certification Board.

PERSONNEL

Dr. T.J. Taylor, staff veterinarian, resigned in July 1971 to continue postgraduate studies at York University. After a careful evaluation of the Division's needs it was decided to replace Dr. Taylor with an Animal Health Technician rather than with another veterinarian. These technicians (AHT) are a new type, not animal technicians in the usual sense; they have undergone special training in two years at one of the several community colleges which are offering these courses, to assist veterinarians. They are analogous to nurses and other paramedical personnel in human medicine. Miss Lyn McEwen has been appointed to this position and the trial already appears to be successful in relieving Dr. Fletch of many routine tasks, as well as many of the duties formerly carried out by Dr. Taylor. Dr. Fletch is now able to handle strictly professional problems, as well as carry out his responsibilities as pathologist for the Division. We anticipate that AHTs will become increasingly useful in laboratory animal facilities in the future.

Personnel trained in the Division are in demand for positions of increased responsibility in other institutions. Mr. W. Arseneau has been appointed supervisor of the animal facilities at Erindale College and Mr. Don Potter has gone to the Ontario Science Centre as supervisor of animal facilities.

Co-operation with other Divisions

The Division continues to operate the animal facilities of the Clarke Institute, under contract, and is also responsible for professional supervision of the animal facilities at the Faculty of Dentistry. The newly established Gage Research Institute has requested that the Division operate its animal facilities as soon as they are completed.

The University Teaching Hospitals Association (UTHA) has established a Joint Hospitals Animal Care Committee to correlate and integrate animal care among the member hospitals and the Faculty of Medicine. The Director of DLAS is an ex-officio member of this committee. Surveys are being conducted by the committee to determine specifically which facilities, equipment, services, and resources can be shared. As a first step, a programme has been established whereby the affiliated hospitals can borrow animal care equipment from DLAS to meet emergency needs. A number of hospitals are presently taking advantage of this programme.

Dr. Fletch serves as the veterinarian, required under the Animals for Research Act, for several of the hospital animal care committees.

The Director and staff have been consulted by a number of institutions in the planning, design, and operation of Canadian and U.S. animal facilities, including the University of Calgary, McMaster University, Memorial University, University of Guelph, Conestoga College, the Wellesley Hospital, and the Trudeau Institute at Saranac, N.Y.

RESEARCH

A specific mission of DLAS is the study and control of the natural infections of laboratory animals. The most intensive and productive effort this year has been an investigation of a serious epidemic of respiratory disease in the mouse colony at the Ontario Cancer

Institute. It has been established that Sendai virus, carried by the OCI stocks, was responsible for the epidemic in virgin immigrant animals. Although Sendai virus is carried by many mouse colonies, it has not previously been reported as associated with epidemic outbreaks. In connection with this problem a survey was undertaken to determine the silent viruses carried in Canadian mouse colonies. Such surveys have been done in the U.S. but have not previously been undertaken in Canada. The preliminary survey has established that all colonies tested carry one or more viruses and that colonies tend to harbour a specific "spectrum" of viruses. The dangers of cross infection inherent in bringing animals from two colonies together, exemplified by the OCI outbreak, are of such great significance to investigators that it is planned to extend the survey to all Canadian colonies.

Dr. Fletch is collaborating with Dr. J. Davidson of the Radiological Research Laboratories in developing techniques for lymph node microstructure.

Tuberculosis in primates continues to be a problem, several new cases being found this year, in spite of the fact that the animals had been quarantined for three weeks and tuberculin tested by the supplier prior to being received at DLAS. Accordingly, a supplementary quarantine, examination, and testing programme has been instituted to supplement the supplier's programme, and data are being collected to determine whether or not we can prevent infected animals from reaching the investigator and thus lessen the hazard of infection with Simian B Virus.

Distemper is the most serious problem encountered in use of dogs from the pounds. Susceptible dogs contract the disease when impounded, but since the impounding period is shorter than the incubation period they often do not develop clinical illness until some time after arrival in the laboratory. A vaccination-on-impounding programme has been set up in collaboration with several pounds and data are being collected to determine whether or not such a programme will reduce the incidence of distemper, both in the pounds and in the laboratory. The animals are also vaccinated against rabies because of the apparent increase in this zoonosis in animals in Ontario.

Because we are the only laboratory in Canada specifically oriented to laboratory animal diseases, we receive numerous requests for assistance in diagnosis and control of outbreaks in other institutions. Among institutions which have requested assistance are the University of Western Ontario, York, McMaster, University of Saskatchewan, the National Institutes of Health (U.S.), and several of the affiliated hospitals. In addition, of course, investigators on the University staff frequently consult us on specific problems.

Potentially, one of the most useful functions of the laboratory is collaborating with the producers of laboratory animals to detect and eliminate diseases in the production colonies, thus eliminating entry of these agents into our research colonies. Increasingly, commercial breeders are bringing their problems to us for advice and help.

SCHOLARLY ADDRESSES

L.R. CHRISTENSEN, "Elimination of Disease in Breeding Colonies," CALAS National Convention, Toronto, Nov. 1971; "Diseases of Mice and Rats I & II," Symposium on Laboratory Animal Diseases, St. Lawrence College of Applied Arts and Technology, Kingston, March 1972.

PUBLICATIONS

- Fletch, A.L., Beswatherick, M. and Christensen, L.R. "Bovine Tuberculosis in a Squirrel Monkey" (*CALAS Newsletter*, Dec. 1971) (abstract)
 Fletch, A.L. and Christensen, L.R. "A Survey of Murine Viruses in Commercial and Canadian Research Mouse Colonies" (*CALAS Newsletter*, Dec. 1971) (abstract)
 Fletch, A.L. and Karstad, L.H. "Studies on the Pathogenesis of Epizootic Haemorrhagic Disease of White-tailed Deer" (*Canadian Journal of Comparative Medicine*, vol. 35, 1971, pp. 244-8)

DIVISION OF STUDIES IN MEDICAL EDUCATION

Under the direction of Dr. A.I. Rothman

Service and Advisory Activity

During the past year the Division's staff played an active role relative to the instructional programme in all three periods of the undergraduate curriculum and in the area of postgraduate medical education.

Staff members sat on all three period curriculum committees and served as consultants in various capacities to many of the systems and topics committees. In addition, members of the Division had extensive involvement with the Department of Family and Community Medicine, the Department of Preventive Medicine, and the Admissions Committee.

In Period I the Division participated in the deliberation of the Cinader Committee and a Division member chaired the committee responsible for the production of the experimental, integrated, comprehensive examination. In Period II, a Division member chaired an *ad hoc* committee on student evaluation.

The Division, with the co-operation of the Division of Postgraduate Medical Education administered a mock-up of the L.M.C.C. examination to final-year students at the University of Toronto, University of Western Ontario, Ottawa University, Queen's University, and McMaster University. At present, a Division member is chairing a committee charged with the responsibility of producing a new version of this test.

Division members consulted with individual members of faculty on problems of research design and data processing. They are serving on the programme committee of the Panamerican Conference on Medical Education to be held in Toronto 28-30 August 1972.

Curriculum Evaluation

As in past years, the Division has co-operated with the Medical Society and the teaching faculty in the design and administration of student evaluation questionnaires for each of the systems and topics in Periods I and II and at the end of Period III. Information from these questionnaires was returned to the appropriate members of faculty and has had considerable effect on subsequent planning.

At present, in Period III a more systematic evaluation of clerkship rotations at each of the teaching hospitals is being planned.

A progress report of the new undergraduate curriculum was offered to faculty at a general meeting in October 1971. A Division member chaired the planning committee charged with the responsibility of arranging the programme for this meeting.

Developmental Projects

The Division has co-operated with the Period II Cardiovascular System Committee and the Period I Endocrinology Committee in developing small-group teacher-training sessions.

With the co-operation of the Period II Haematology Committee, the Division provided final-year students in Psychology and Sociology from York University with the opportunity to practise observation and evaluation techniques in seminar-teaching situations.

Considerable time has been spent on a project directed towards the improvement of large-group lecturing. Teachers have been given the opportunity to see themselves lecturing through the medium of videotape recordings. They are then guided through a rational self-evaluation of their own performance.

Over the past year, the Division co-operated with the Division of Medical Computing in the development of new test-scoring procedures and the writing of a new

users' manual. Presently, planning for the development of a computer-managed multiple-choice item bank is in the preliminary stages.

RESEARCH

Career-Choice Study

A follow-up study of University of Toronto medical graduates was begun in the spring of 1966, based on a mailed questionnaire survey of the class of 1965. Since then, questionnaires have been administered yearly to each graduating class. Items on the questionnaire relate to career choice and intention, advanced training, location and organization of practice, and professional involvement.

A Cross-Disciplinary Study of Attitudes to Social Issues in Medicine

A test that measures awareness of and attitudes towards social issues in medicine was given to students in medicine, nursing, pharmacy, dentistry, and social work. Comparisons between students participating and not participating in SHOUT (Student Health Organization, University of Toronto) were made.

Students Attitudes Towards Concepts of Family Medicine

The *Yale Attitude Survey* was used to measure clinical clerks' attitudes toward the central concepts of family medicine before and after they entered that service. The intention was to compare clerks' attitudes under the old programme with those developed in the new family medicine programme in the ambulatory care block.

Psychological Testing Programme

This programme has been operational since the fall of 1967. The objectives are: (1) to identify factors that relate to academic performance, clinical performance, career choice, and, ultimately, professional performance; (2) to provide information useful in the context of curriculum monitoring and evaluation.

Attitudes Towards Social Issues in Medicine

The development of an instrument to measure awareness of and attitudes towards social issues in medicine is nearing completion.

Lecture Performance Scale

The development of a scale to rate lecturer performance, in conjunction with video-taped playback of the lecture is in process.

Observation Study of the Clinical Clerkship

A study of the clinical clerkship in the Department of Medicine and Department of Anaesthesia at the Toronto General Hospital and St. Michael's Hospital based on observations and student evaluation questionnaires is in process.

Study of Applicants

All students applying for entrance in September 1972 were given a battery of psychological tests consisting of a personality assessment instrument, tests of cognitive style and tolerance of ambiguity, and the medical opinion survey. The comparisons between accepted and rejected students will be of major interest.

Study of Applicant Interviewing

The objective of this study is to explore the basis for assigning interview recommendations to students entering the University of Toronto Faculty of Medicine in September 1971 and 1972. This is to be achieved by correlating interview ratings with student scores on MCAT and personality and attitude tests.

Cross-Disciplinary Study of Perceptions of Learning Environments: Medicine vs. Law

A study involving the administration of the Learning Environment Questionnaire

(LEQ) to first-year medical students at the University of Toronto and first-year law students at the University of Montreal is almost completed.

SCHOLARLY ADDRESSES

N. BYRNE, "The Impact of Rehabilitation Workshop Programs by Way of Changing Notions Concerning Man and Work in Our Society," at Ontario Rehabilitation Workshop Council, McMaster University, Hamilton, June 9, 1972.

M.A. FRUEN, "Career Decision in Medicine: A Follow-up of 1965 Graduates," at annual meeting of Association of Canadian Medical Colleges, Edmonton, October 1971; "Career Choice Study: Methodology and Problems" at the Fourth Workshop on Longitudinal Research in Medical Education, Chicago, February 1972.

J. PARLOW and A.I. ROTHMAN, "Personality Traits of First-Year Medical Students: Trends Over the Four-Year Period 1967-1970," at annual meeting of Association of Canadian Medical Colleges, Edmonton, October 1971; "Personality Traits of Entering Students Over a Five-Year Period," at annual meeting of Association of American Medical Colleges, Washington, October 1971.

NEW APPOINTMENTS

During the past year, P.N. Byrne, an educational psychologist from the Ontario Institute for Studies in Education, and Dr. J.W. Steiner joined the Division. Dr. Steiner will participate in the Division's service activities involving the conduct and evaluation of the undergraduate curriculum.

PUBLICATIONS

Byrne, N. "Psychologism: A Psychology or a Politic" (*Ontario Psychologist*, vol. 3, 1971, pp. 11-19)

Byrne, N. and Day, H.I. *Workshop Programs in Psychiatric Hospitals: An Empirical Investigation of Two Hospitals and Some Theoretical Explanations*. Toronto: Ontario Department of Health 1971, Pp. 76

Byrne, N. (with Quarter, J.) (eds.) *Must Schools Fail: Issues in Education in Canada*. Toronto: McClelland & Stewart 1972. Pp. 301

Rothman, A.I. and Moldofsky, H. "Personality, Disease Parameters and Medication in Rheumatoid Arthritis" (*Journal of Chronic Diseases*, vol. 24, 1971, pp. 363-72)

Steiner, J.W. and Parlow, J. "Medical Faculty Explains Purpose of Attitude Survey of Applicants" (*University of Toronto Bulletin*, Jan. 28, 1972, pp. 3-4)

ANAESTHESIA

Under the direction of Professor R.A. Gordon

The departmental contribution to teaching in the undergraduate curriculum has continued to expand, with contributions to the teaching of Pharmacology in Period I and an increasing commitment to the curriculum of the Respiratory and Cardiovascular Systems in Period II. The evolution of the clinical clerkship in the Department, the development of electives particularly in Period III, and methods of evaluating the clerkship have continued to require particular attention in the teaching hospitals.

Methods of teaching and evaluation at the postgraduate level have come under particular scrutiny during this session, and activity in this field was considerably stimulated by a Survey of Postgraduate Training Programmes conducted by the Royal College of Physicians and Surgeons of Canada. New methods of evaluation and new forms for recording these evaluations have been adopted by the Departmental Council on a trial basis, and a bank of objective-type questions to be used in student-evaluation and self-evaluation programmes for members of the staff are being developed with the co-operation, advice, and assistance of the Department of Medical Education.

There were sixty-five postgraduate students in the Department during the year, including those attached for training to the Department of Medicine. Of these, twenty-seven were registered in the Diploma Course, the remainder being sessional students. The Diploma in Anaesthesia of the University of Toronto was awarded to Dr. B.J. Green, Dr. B.P-N. Mo, Dr. C.A. Murchland, Dr. J. Obdrzalek, Dr. O. Vacharaksa, and Dr. D.G. Wills.

During this session, with the co-operation of the Division of Postgraduate Medical Education, the Department instituted a programme of on-site refresher courses in Anaesthesia for General Practitioners which were provided by members of the Department for a period of one week in local hospitals, at the invitation of the practitioners of the area. This programme was under the direction of Professor A.J. Dunn, and courses were provided on this basis at Arnprior, Brampton, Kirkland Lake, Parry Sound, and Thunder Bay. This was considered to be a most useful method of continuing medical education, possessing the double advantage of permitting the practitioner taking the course to remain involved in his practice, while at the same time relating his additional training in the subject to his everyday environment and day-to-day problems. This method of carrying forward the continuing education programme is considered by all who have participated to be superior to the organized refresher courses of similar length conducted in the teaching hospitals, but it is thought likely that a combination of the two types of course may produce the optimum results for the individual practitioner.

The Department of Anaesthesia has continued to co-operate in the project to provide Medical Services to the Indian Hospital at Sioux Lookout, and members of the staff of the several teaching hospitals have provided anaesthetic service for special surgical sessions intermittently throughout the year.

Members of the Department have continued in exemplary fashion to discharge numerous responsibilities to administrative commitments in the teaching hospitals, in professional organizations, and in the teaching of members of the nursing profession and paramedical technical personnel. In this latter field, the contribution of Dr. Arthur Scott to administrative committees at the national and international level and to the organization of curriculum and the teaching of respiratory technologists in the Toronto School for Medical Technology has been particularly onerous and merits special recognition in this report. Dr. Scott has had the assistance of a number of devoted and interested colleagues in the prosecution of this teaching programme.

Dr. James Shapley has been chairman of the Canadian Standards Association Committee on Hospital Safety. Dr. Jeremy Sloan was a member of the working party of the International Standards Organization Committee on Anaesthetic Equipment which is charged with the development of standards for paediatric anaesthetic equipment.

The thirteenth Dr. Harry Shields Lecture was presented by Professor Torsten Gordh of the Karolinska Institute of Stockholm, Sweden, on Friday 3 December 1971. Professor Gordh's subject was "Studies of the Effects of Anaesthetics on the Heart." Professor Gordh also spent one week in the Department as an academic visitor.

The second Murray Mendelson Memorial Lecture was given by Professor Francis Foldes of the Albert Einstein School of Medicine, Yeshiva University, New York City, on Friday, 25 April 1972. Dr. Foldes' subject was "Current Concepts of the Action of Muscle Relaxants."

Professor N.P. Singh of the Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India, addressed the Department on Monday, 4 October 1971, on the subject of "Treatment of Tetanus." Dr. W.W. Mapleson of the Department of Anaesthesia of the Welsh National School of Medicine at Cardiff lectured to the Department on 20 December 1971 on the subject of "Recovery from Halothane." Dr. Alastair A. Spence of the University of Glasgow lectured to the Department on 12 April 1972 on "Mechanisms of Postoperative Hypoxaemia."

Other distinguished visitors during the academic year included Professor James Payne, Research Professor of Anaesthesia, Royal College of Surgeons of England;

Professor James Parkhouse of the University of Manchester; Dr. Andrew Hunter of the Royal Infirmary, Manchester; Professor Philip Bromage, McGill University; Professor Gordon Wyant, University of Saskatchewan; Professor Stuart Vandewater, Queen's University; Dr. Evan Hallett, Royal Adelaide Hospital, South Australia.

The Department has throughout the year continued its liaison with departments of Anaesthesia in developing countries, and has continued to offer assistance where appropriate and when requested by these institutions. On this basis, Dr. Dorothy Ffoulkes-Crabbe, Senior Lecturer at the University of Lagos College of Medicine, has spent the past academic session in the Department; training has been continued for nominees from the teaching staff of the University of Medical Sciences and Siriraj Hospital in Bangkok, Thailand, and the College of Medicine of the University College, Ibadan, Nigeria. It has been arranged to provide assistance in the development of the Department of Anaesthesia of the new medical school at the University of Benin in Mid-West Nigeria, and this now awaits finalization of appropriate financial arrangements for the support of visiting staff.

Dr. D.C. Finlayson of the Department in St. Michael's Hospital accompanied a Cardiovascular Surgery team to the Philippines in November and December 1971 for the purpose of demonstrating and teaching Anaesthesia for Cardiovascular Surgery at Manila. This project was under the joint sponsorship of the governments of Canada and the Republic of the Philippines.

RESEARCH

During the session, regular monthly research seminars were instituted under the chairmanship of Professor A.C. Bryan, to provide a forum for presentation and informal discussion of work in progress and for the initial presentation and discussion of protocols or new research proposals. It has been evident that time will not permit the detailed discussion in this way of all work going forward in the Department. The role and format of these seminars will require re-examination and revision.

Professor A. Charles Bryan has directed research into the following aspects of the problems of respiratory failure, in association with the individual members of the Staff of the Toronto General Hospital and the Hospital for Sick Children indicated in each case:

1. *The Effects of Acute Fluid Overload (with Dr. A.K. Laws)*. Increased pulmonary extravascular water is common in respiratory failure, but its effect on pulmonary function in man is not clearly understood. We have therefore been studying the effect of rapid infusion of two litres of saline into normal subjects. We have established that the "closing volume" of the lung starts to increase after 500 ml and that after 2000 ml the change is large. We have postulated that the accumulation of fluid in the bronchovascular sheath is responsible for the premature airways closure. The airways closure leads to shunting and in most subjects the alveolar-arterial oxygen difference doubles. Using radioactive Xenon¹³³ we have confirmed this maldistribution of ventilation, but also have some evidence of redistribution of blood flow. From chest X-rays we have established the early signs of pulmonary fluid overload. Using spontaneous continuous positive pressure breathing we have been able to prevent airways closure and maintain a normal alveolar-arterial oxygen difference during fluid overload.

2. *Airway closure and elastic recoil in children (with Dr. Henry Levison)*. Small airways disease in children and old people often precipitate respiratory failure, whereas this is rare in other age groups. We have found that children, like old people, have a high closing volume, indicating instability of the small airways. We attribute this to low elastic recoil, which has not developed in children and is lost in old age. This instability of the small airways appears to account for the low arterial oxygen in small children and contributes to their susceptibility to respiratory failure. The methodology to visualize the behaviour of the small airways in excised infant lungs using tantalum bronchography is being developed.

3. *Aetiology of the "Low Lung Volume Syndrome" (with Dr. John Edmonds)*.

Patients during anaesthesia and in respiratory failure are known to operate a low lung volume leading to airways closure and hence shunting. The mechanism for this is often not clear. At end expiration in the supine position, the anterior abdominal wall and diaphragm are said to be completely relaxed. However, we had shown that succinylcholine in a conscious subject is followed by a large cephalad displacement of the diaphragm, indicating that there must be considerable tone in either the diaphragm or the abdominal wall keeping the abdominal contents out of the thorax. We are now developing the techniques of electromyography of the respiratory muscles to investigate this further.

4. *Spontaneous continuous positive pressure breathing (with Dr. John Edmonds)*. A logical extension of positive end expiratory pressure on a ventilator is to use spontaneous continuous positive pressure breathing. In some cases it makes mechanical ventilation unnecessary and it is particularly useful in weaning from ventilators. It has been successfully used on a large number of children and has been used occasionally on adults.

5. *Mechanics of acute asthma (with Dr. Henry Levison)*. We have been studying the mechanics of provoked asthmatic attacks. We have documented two distinct patterns of response. The first is characterized by airways closure at a high transpulmonary pressure which is not always completely relieved by isoproterenol. The second is characterized by bronchospasm without much closure and is reversed by isoproterenol. Both types can be blocked by sodium chromoglycate. The methodology to visualize these changes in animals using tantalum bronchography is being developed.

6. *The management of status asthmaticus (with the Staff, Intensive Care Unit, Hospital for Sick Children)*. Continuous intravenous infusion of isoproterenol has been proposed as an alternative to artificial ventilation. We have managed a number of cases this way successfully, but are puzzled by some aspects of the results. We are now measuring cyclic AMP levels as a measure of Beta receptor activity and the effect of large doses of isoproterenol on this activity. Also isoproterenol produces a potentially dangerous tachycardia and we are proposing to try agents with specific Beta 2 activity.

7. *Effects of curare and pancuronium on airway resistance (with Dr. R. Crago)*. There is some controversy about the effect of curare on airways resistance and no information on the effect of pancuronium. Using a forced oscillation technique we have studied the effect of curare and pancuronium on airways resistance during routine anaesthesia. It has been established that curare causes a large rise in airways resistance in any patient who initially has a high resistance. These patients had chronic obstructive lung disease and none of them were known asthmatics. Pancuronium does not affect airways resistance, even in patients with severe asthma. We have concluded that curare should be used with caution in chronic lung disease and that pancuronium should be used in cases of respiratory failure that need paralyzing to ventilate them.

8. *Back flow in arterial lines (with Dr. John Edmonds)*. It has been shown that flushing arterial lines may lead to back flow and a potential mechanism for flushing thrombi into the brain. The amount of back flow is dependent on the size of the patient and the volume and rates of the flush. Conditions are worst in small children. We are investigating this using flush solutions labelled with Pertechnitrate ion which we can detect by scintillation counting over the carotid artery.

Dr. Beverley Britt has continued her studies of malignant hyperthermia associated with anaesthesia, and has extended her investigation of human survivors and of the members of families afflicted with this genetic abnormality, with financial assistance from the Medical Research Council and the P.S.I. Foundation. She has also continued investigations of a similar syndrome found in certain strains of swine, and in this phase of her studies has received invaluable co-operation from Professor John N. Cummings of the Ontario Veterinary College, University of Guelph.

Dr. James Duffin in co-operation with Dr. C.H. Hockman of the Department of Pharmacology has carried forward studies to show the importance of the limbic influence on respiration and to delineate a possible means by which emotional factors may alter breathing. With Dr. Hockman, he is also studying the mechanism of respiratory arrest with depressants such as halothane, nitrous oxide, and alcohol.

In co-operation with Dr. R.C. Good of the Department of Physiology, Dr. Duffin has carried out experiments designed to measure the neural drive component of breathing during exercise and during sensory stimulation. This project is partially complementary to the limbic system study in attempting to determine the effect on respiration of sensory traffic through the reticular formation, which is coupled to the limbic system. With Dr. Good and Dr. S. Galloon, Dr. Duffin is commencing studies on the effects of ketamine on the ventilatory response to carbon dioxide breathing, and the effects of anaesthetics on the peripheral chemoreceptor mediated ventilatory drive.

Dr. Duffin has designed a gas powered ventilator, controlled by fluidic logic elements, and clinical testing of this device is to go forward with the co-operation of Dr. Samuel Galloon.

Toronto General Hospital

Dr. Alan K. Laws has studied pulmonary changes in experimental pulmonary oedema in human volunteers, has studied capacitance vessel function in quadraplegia and paraplegia, and has extended his studies of respiratory resistance during anaesthesia.

Dr. Samuel Galloon has completed a study on the use of ketamine hydrochloride in anaesthesia for minor gynaecological procedures, and commenced a study of the effects of anaesthetic agents on the muscle tone of the pregnant uterus. Dr. Galloon is also collaborating with Dr. Duffin in the development of a new gas-powered ventilator and in studies on ventilatory drive previously outlined.

Dr. Ramon Evans has continued his studies on the management of intractable pain, supported by the Irene Eleanor Smythe Fund.

Dr. John Desmond has carried forward a study of the influence of prolonged methoxyflurane anaesthesia on renal function in surgical patients, and in collaboration with Dr. Alan Laws has investigated the role of altered response of capacitance vessels in untoward reactions of quadriplegic patients to administration of anaesthetic drugs and to surgical manipulations.

Dr. E.R. Michel, in conjunction with the departments of Neurosurgery and Radiology, has continued the investigation of alterations in baroreceptor function in patients undergoing carotid endarterectomy.

Dr. Arthur Scott has continued his studies of the treatment of respiratory failure, and is engaged in a study of tracheal damage in patients after long-term ventilation.

Dr. L.S. Bowers is investigating the effects of hyperventilation with oxygen on the duration of the convulsion after the shock phase in electroconvulsive therapy.

St. Michael's Hospital

Dr. W.H. Noble has studied changes in respiratory parameters in pulmonary oedema. A new extravascular thermal volume ETV_L technique for quantitation of pulmonary oedema was evaluated and a good comparison was found between the thermodilution and indocyanine green dye techniques for the measurement of cardiac output in dogs with and without pulmonary oedema.

A study of halothane washout curves from anaesthetic machines done by Dr. Noble and Dr. Hanna Samulski revealed that halothane is being delivered to almost every patient as well as to personnel in the operating theatre, even in those cases where halothane is not used as the anaesthetic agent.

Dr. W.W. Stoyka has continued studies of cardiovascular and haematological changes associated with induced hypoxia during anaesthesia, and with the assistance of a grant from the Ontario Heart Foundation has commenced an assessment of the thermodilution technique for determining cardiac output in the clinical circumstances of the Intensive Care Unit.

Toronto Western Hospital

Dr. David Evans has continued his studies of the effect of veno-arterial bypass on cardiopulmonary haemodynamics in the dog and in man. Dr. Michael Krestow has continued his clinical studies with ketamine, designed to evaluate its range of usefulness as a general anaesthetic agent.

Wellesley Hospital

Dr. A.F.D. Cole has undertaken a study of gas exchange during anaesthesia in patients with chronic renal failure and anaemia. Dr. P.R. Ramachandran and Dr. R. Rajagopalan have studied the application of the Sanders technique of ventilation by an injector mechanism in its application to laryngoscopy, and have shown this to be effective without the necessity of intubation of the trachea.

Hospital for Sick Children

The research interests of the Department of Anaesthesia may be defined broadly as pulmonary function in anaesthetized children, the effects of severe hypoxaemia in relation to anaesthesia, changes in cerebral blood flow and intracranial pressure under anaesthesia, and various miscellaneous clinical investigations.

Dr. H.I.A. Nisbet, with Dr. D.A. Pelton, Dr. J.E.S. Relton, and Dr. D.J. Steward, has shown that functional residual capacity in children undergoing various operative procedures under anaesthesia and artificial ventilation fell to a greater degree than has been reported in adults from those values recorded in the awake patient in the supine position. Various methods of maintaining lung volume during artificial ventilation and anaesthesia are being investigated.

Children undergoing an operation for congenital heart disease were found to have lower static lung compliance than normal children, and specific lung compliance was also lower than in normal children of similar body configuration.

Oxygen consumption has been measured in normal children during artificial ventilation under methoxyflurane, and has been found to be lower than that predicted.

A new piston ventilator has been designed to make these studies possible.

The effects of different patterns of artificial ventilation over prolonged periods have been investigated in beagle dogs.

Dr. R.S. Cohen, Dr. H.I.A. Nisbet, Dr. R.E. Creighton, Dr. A.E. Johnston, and Dr. I.A. Sloan have investigated cardiovascular and respiratory responses to severe hypoxaemia under anaesthesia with halothane, methoxyflurane, and trichlorethylene.

Dr. R.S. Cohen, with Dr. H.I.A. Nisbet, Dr. R.E. Creighton, and Dr. D.J. Steward, has investigated the effect of hypoxaemia upon cerebral blood flow and cerebral oxygen transport under halothane, methoxyflurane, and trichlorethylene anaesthesia. Cerebral oxygen transport was maintained during hypoxaemia under light anaesthesia. Studies have been commenced on the effects of postural changes upon cerebral blood flow and cerebral spinal fluid pressure under various anaesthetic conditions.

Dr. J.S. Whalen and Dr. W.M. Brummitt have continued their studies of ketamine for paediatric anaesthesia with particular reference to children with burns, abnormalities of the upper airway, and in relation to rare conditions such as epidermolysis bullosa.

Dr. A.E. Johnston and Dr. H.I.A. Nisbet have studied the effect of calcium ions on the monovalent and divalent cation levels in plasma and urine during and after cardiopulmonary bypass in children.

A simple scoring system used in adults has been modified by Dr. Nisbet to provide objective measurement of sedation in children. The reaction of children to anaesthesia and surgery is now being studied in greater depth.

Additional studies at The Hospital for Sick Children are directed to assessment of the effects of atropine, prostigmine, and pancuronium in children.

Dr. D.J. Steward has continued his studies of calcium uptake into sarcoplasmic reticulum preparations from the muscles of pigs known to be susceptible to malignant hyperthermia, in association with Dr. Beverley Britt and Dr. Werner Kalow.

HONOURS

PROFESSOR R.A. GORDON was Vice-President of the World Federation of Societies of Anaesthesiologists.

DR. ARTHUR DUNN was Chairman of the Section on Anaesthesia of the Ontario

Medical Association, and Chairman of Council of the Canadian Anaesthetists' Society.

DR. ALAN CONN was Chairman of the Program Committee, Canadian Anaesthetists' Society.

DR. I.M. MACKAY was Vice-President, Canadian Anaesthetists' Society.

DR. R.L. MATTHEWS was Chairman of the Education Committee, Canadian Anaesthetists' Society.

DR. BRIAN MARSHALL was awarded a Certificate of Honour (together with Dr. T.P. Morley of the Department of Surgery) in recognition of an outstanding contribution in the form of a Scientific Exhibit at the Congress of Neurological Surgeons at Miami, Florida, in October 1971.

DR. CHARLES BRYAN was Visiting Professor in the Department of Physiology at the University of Manitoba in September 1971, and at McMaster University, Hamilton, in January 1972.

SCHOLARLY ADDRESSES

DR. A. CHARLES BRYAN, "The Effects of Acceleration on the Lung," Yerevan, U.S.S.R., 26 September–9 October 1971; "Principles of Respiratory Therapy" and "Hypobaric Medicine," Postgraduate Course in Respiratory Pathophysiology, Montreal, 1–5 November 1971; "Man and his Environment," "Adaptation to Altitude," "The Effects of Acceleration on the Lung," and "Functional Development of the Lung," Department of Physiology, Winnipeg, Manitoba, 19 September 1971; "The Effects of Acute Fluid Overload," Symposium on "Anaesthesia and the Kidney," University of Manitoba, Winnipeg, 12 November 1971; "Carbon Monoxide Poisoning," McMaster University, Hamilton, January 1972; "Airways Closure in Children," American Academy of Paediatrics, Chicago, October 1971; "Peculiar Mechanical Characteristics of the Child's Lung," Federation of American Societies of Experimental Biology, Atlantic City, N.J., April 1972.

DR. BEVERLEY A. BRITT, "Recent Advances in Malignant Hyperthermia," Annual Meeting, International Anaesthesia Research Society, Las Vegas, Nevada, 13 March 1972.

DR. W.M. BRUMMITT, "Special Applications of Ketamine Hydrochloride in Paediatrics," Department of Anaesthesia, University of Laval, Quebec City, November 1971.

DR. R.S. COHEN, "The Effects of Hypoxaemia on Cerebral Blood Flow and Cerebral Spinal Fluid Pressure in Dogs Anaesthetized with Glaxo CT 1341, Pentobarbitone and Methoxyflurane," Canadian Anaesthetists' Society Annual Meeting, Halifax, June 1972.

DR. A.W. CONN, "Fluid and Electrolytes" and "The Paediatric Intensive Care Unit," Second Annual Scientific Meeting, Minnesota Society of Anaesthesiologists, Rochester, Minnesota, September 1971; "Breathing Machines for Medical Use," Mount Sinai Hospital, New York City, December 1971; "Management of Respiratory Failure" and "Drug Doses in Infants and Children," Tenth Clinical Conference in Paediatric Anesthesiology, Children's Hospital of Los Angeles, Los Angeles, California, January 1972; "Naso-tracheal Intubation in the Management of Airway Problems," Postgraduate Course in Paediatric Laryngology and Broncho-Oesophagology, The Hospital for Sick Children, Toronto, February 1972; "Anaesthesia for the Injured Child" and "Intensive Care for Children with Multiple Injuries," Postgraduate Course on Complex Trauma in Children, American Academy of Orthopaedic Surgeons, Atlanta, Georgia, March 1972; "Intensive Care for Multiple Trauma," Department of Anaesthesiology, University Hospital, Syracuse, N.Y., April 1972; "Respiratory Emergencies in Children," Stratford General Hospital Clinical Seminar, Stratford, Ontario, May 1972.

DR. R.R. CRAGO, "Respiratory Flow Resistance after Curare and Pancuronium, Measured by Forced Oscillations," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 20 June 1972.

DR. R.E. CREIGHTON, "General Anaesthesia in Eight Patients with Familial Dysautonomia," Canadian Anaesthetists' Society Annual Meeting, Quebec City, July 1971.

DR. JOHN DESMOND, "Methoxyflurane Nephrotoxicity," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 22 June 1972.

DR. JAMES DUFFIN, "The Effect of Halothane and Barbiturate Anaesthesia on the Ventilatory Responses mediated by the Peripheral Chemoreceptors in Man and Dog," Clinical Research Society of Toronto, Toronto, 15 May 1972; "An Analog Computer Model of the Chemoreflex Control of Ventilation," Conference on Engineering in Medicine and Biology, Las Vegas, Nevada, 31 October 1971.

DR. SAMUEL GALLOON, "Ketamine for Dilatation and Curettage," Laval University, Quebec City, 22 November 1971, and Sherbrooke University, Sherbrooke, P.Q., 10 January 1972; "Intravenous Anaesthesia," "Harmful Effects of Intermittent Positive Pressure Ventilation," and "Ketamine Anaesthesia," Department of Anaesthesia, Memorial University of Newfoundland, 14-15 April 1972.

DR. PATRICIA GOODHALL, "The Effect of Halothane on the Pattern of Reaction to Anoxia in the Newborn," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 19 June 1972.

DR. A.E. JOHNSTON, "Biochemical Effects in a Haemodilution Technique using ACD Blood Prime in Paediatric Patients undergoing Bypass Open-Heart Surgery," Canadian Anaesthetists' Society Annual Meeting, Quebec City, July 1971; "Haemodilution in Cardiopulmonary Bypass in Children - A Comparison of Two Different Diluents in the Pump-Oxygenator Prime," Annual Meeting of the Clinical Research Society of Toronto, Toronto, March 1972, and Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 19 June 1972.

DR. JAMES H. KERR, "Epidural Anaesthesia for Obstetrics," Department of Anaesthetics, Guy's Hospital, London, December 1971.

DR. ALAN K. LAWS, "Pulmonary Function in Experimental Pulmonary Oedema in Man," American Society of Anesthesiologists Annual Meeting, Atlanta, Georgia, October 1971; "Newer Aspects of Pulmonary Oedema," Southern Ontario Gas Club, March 1972.

DR. H.I.A. NISBET, "Stress Relaxation in Anaesthetised Children," American Academy of Paediatrics, Chicago, October 1971; "Lung Mechanics in Anaesthetised Children," Academy of Medicine, Toronto, October 1971; "Effect of Anaesthesia and Artificial Ventilation on the Functional Residual Capacity in Children," Queen's University, Department of Anaesthesia, Kingston, Ontario, December 1971; "Haemodilution in Cardiopulmonary Bypass in Children - A Comparison of Two Different Diluents in the Pump Oxygenator Prime" (with Dr. A.E. Johnston) and "A New Piston Ventilator for Use in Respiratory Studies," and "Oxygen Uptake in Ventilated Children Under Methoxyflurane," and "The Objective Measurement of Sedation in Children - A Modified Scoring System," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 20 June 1972.

DR. WILLIAM H. NOBLE, "A New Technique for Measuring Pulmonary Oedema," and "A Comparison of Thermal and Dye Dilution Cardiac Output Determinations," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., June 1972.

DR. JIRI OBDRZALEK, "Respiratory Failure in Pulmonary Oedema," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 20 June 1972.

DR. D.A. PELTON, "Outpatient Anaesthesia," Workshop Session, American Society of Anesthesiologists, Atlanta, Georgia, October 1971; "Stress Relaxation in Anaesthetised Children" (with Dr. Nisbet), The American Academy of Paediatrics, Chicago, October 1971; "Lung Mechanics in the Anaesthetised Child," Academy of Medicine, Toronto, October 1971; "Oxygen Uptake in Ventilated Children under Methoxyflurane" (with Dr. Nisbet), Canadian Anaesthetists' Society, Annual Meeting, Halifax, N.S., June 1972.

DR. P.R. RAMACHANDRAN, "Pulmonary Gas Exchange during Anaesthesia in Patients with Chronic Renal Failure and Anaemia," Canadian Anaesthetists' Society Annual Meeting, Halifax, N.S., 19 June 1972.

DR. J.E.S. RELTON, "Scoliosis – Anaesthetic Considerations," Boston Children's Hospital, Department of Anaesthesia, January 1972, and G.T. Hospital, Bombay, India, March 1972.

DR. A.A. SCOTT, "Intensive Care in Trauma," Timmins and District Medical Society, 28 April 1972.

DR. I.A. SLOAN, "Cardiovascular Monitoring," Workshop Session, American Society of Anesthesiologists, Atlanta, Georgia, October 1971.

DR. BRIAN STEELE, "Functional Residual Capacity in Respiratory Failure," Canadian Anaesthetists' Society Annual Meeting, Halifax, n.s., 20 June 1972.

DR. D.J. STEWARD, "Intra-operative Management of the Neonate," Workshop Session, American Society of Anesthesiologists, Atlanta, Georgia, October 1971; "Out-patient Anaesthesia," and "Management of Body Temperature," Tenth Clinical Conference in Paediatric Anaesthesiology, Children's Hospital of Los Angeles, Los Angeles, California, January 1972; "Malignant Hyperpyrexia – Clinical Experiences and Pathophysiology," and "Management of the Neonate," and "The Anaesthesiologist and the Neonatal Respiratory System," University College of San Diego and San Diego County Society of Anaesthesiology, January 1972; "Anaesthetic Techniques in Endoscopy," Postgraduate Course in Paediatric Broncho-Oesophagology, University of Toronto, February 1972; "Respiratory Problems in Surgical Patients," Academy of Medicine, Toronto, March 1972; "Neonatal Surgery," Operating Room Nurses of Greater Toronto, Toronto, May 1972.

DR. J.S. WHALEN, "Epidermolysis Bullosa," and "Ketamine in Management of Burn Surgery and Upper Airway Problems," American Academy of Paediatrics, Chicago, October 1971.

STAFF CHANGES

The Department suffered a grievous loss in the deaths during the session of Dr. Joseph Vining, formerly Head of the Department at St. Michael's Hospital, and of Dr. Alan B. Noble, Anaesthetist-in-Chief at Sunnybrook Hospital.

Dr. Joseph A. Vining died on 5 March 1972. He was born in Aden and his early life was spent in New York where he graduated from High School in 1930. He graduated B.A. from the University of Toronto in 1934 and M.D. in 1939. He undertook a Rotating Internship at St. Michael's Hospital in 1939–40, became Resident Anaesthetist in July 1940, and left to join the Royal Canadian Army Medical Corps in November 1940. He served in Britain and in Europe from 1942 to 1945, being attached first to the Department of Anaesthesia of 15 Canadian General Hospital, and later as Anaesthetist to Number 2 Canadian Casualty Clearing Station with the rank of Major. On returning to Canada in 1945, Dr. Vining joined the Staff of St. Michael's Hospital in the Department of Anaesthesia. He was appointed Assistant Professor in 1950, and was Head of the Department of Anaesthesia at St. Michael's Hospital from 1952 to 1967. On retiring from his appointment as Head of the hospital service, he remained as Assistant Professor and a Senior Anaesthetist at St. Michael's Hospital. He is survived by his wife, Beatrice, and by one daughter and a son.

Dr. Alan Benjamin Noble died on 19 March 1972. A native Torontonion, he graduated M.D. from this University in 1934. After internship at Toronto General Hospital, he entered general practice in Brampton, taking a special interest in anaesthesia. In 1939, he spent some time in postgraduate training in anaesthesia in England, returning home at the outbreak of war in September of that year. He joined the Royal Canadian Army Medical Corps in 1942, in 1943 was posted to the Service Course in Anaesthesia at McGill University and then became Anaesthetist to Montreal Military Hospital. In 1946, he became Anaesthetist-in-Chief at Hotel Dieu Hospital, Kingston, Ontario, and from 1947 to 1955 was Lecturer in Anaesthesia in the Faculty of Medicine at Queen's University at Kingston. In October 1955, Dr. Noble became Anaesthetist-in-Chief at the Royal Victoria Hospital, Montreal, and Assistant Professor at McGill University. In 1965, he was promoted to the rank of Associate Professor at McGill University. In July 1968, Dr. Noble returned to the University of Toronto as

a Professor in the Department of Anaesthesia and Anaesthetist-in-Chief at Sunnybrook Hospital. Dr. Noble's qualities of leadership and mature judgment were widely recognized throughout the specialty of anaesthesia and the profession of medicine. He was President of the Canadian Anaesthetists' Society in 1955-6. He was awarded the Canadian Anaesthetists' Society Medal in June of 1971 "for his selfless and continuing devotion to the improvement of Anaesthesia as an important part of general medical care in the community." His death is a serious loss to the Department of Anaesthesia of this University and to the profession. He is survived by his wife, one daughter, one son, and five grandsons.

Dr. Evelyn Bateman retired as Anaesthetist-in-Chief, Women's College Hospital, and was succeeded on 1 May by Dr. Edith Rogoman, who was promoted to the rank of Assistant Professor. Dr. Bateman remains as a Senior Anaesthetist on the Staff of the Women's College Hospital.

Dr. G. Foster Smith resigned his appointment as Anaesthetist-in-Chief, Wellesley Hospital, after twelve years in that appointment, and will be succeeded on 1 July 1972 by Dr. Simon Tindal. Dr. Smith will remain on the Staff of the Wellesley Hospital and of this Department.

Both Dr. Bateman and Dr. Smith have provided exemplary leadership in the development of patient care and teaching in their respective hospitals, and at this time we wish to record the appreciation of the Department and of the Faculty for these achievements. We welcome their successors and look forward confidently to the future of the Hospital Departments which are now their responsibility.

The following changes in the staff occurred in the teaching hospitals during the session.

Toronto General Hospital

New appointment to the rank of Clinical Teacher: Dr. J.C. Jenkins (effective July 1, 1971), Dr. C.O. Odugbesan (effective July 1, 1971), Dr. L.S. Bowers (effective January 1, 1972), Dr. P. Padilla-Santos (effective January 1, 1972), Dr. E.M. Yamka (effective January 1, 1972), Dr. D. J. Openshaw (effective February 1, 1972), Dr. I. Smith (effective May 1, 1972).

Promotion to the rank of Assistant Professor: Dr. B.A. Britt, Dr. A.K. Laws.

Resignations: Dr. M.E. Hunter (effective September 30, 1971), Dr. B.R. Puddy (effective December 31, 1971), Dr. N.O. Jones (effective April 30, 1972), Dr. L.S. Bowers (effective June 30, 1972), Dr. P. Padilla-Santos (effective June 30, 1972), Dr. E.M. Yamka (effective June 30, 1972).

Hospital for Sick Children

New appointment to the rank of Clinical Teacher: Dr. D.W. Davies (effective January 1, 1972).

St. Michael's Hospital

New appointment to the rank of Clinical Teacher: Dr. D.C.M. McKee (effective July 1, 1971), Dr. J.D. Sinclair (effective July 1, 1971).

Promotion to the rank of Assistant Professor: Dr. D.M. Gebbie, Dr. J.A. Jacobs, Dr. Wm. H. Noble, Dr. Wm. E. Young.

Promotion to the rank of Associate: Dr. Z. Bak, Dr. A.H. Cole, Dr. F.P. Rossitter, Dr. S.T. Zeglen.

Sunnybrook Hospital

New appointment to the rank of Clinical Teacher: Dr. T.V. Rao (effective July 1, 1971), Dr. R.E. Needs (effective January 1, 1972).

Toronto Western Hospital

New appointment to the rank of Clinical Teacher: Dr. R.F. Dymond (effective July 1, 1971), Dr. R.M. Perkins (effective January 1, 1972).

Promotion to the rank of Assistant Professor: Dr. J.B. Gilbert.

Wellesley Hospital

New appointment to the rank of Clinical Teacher: Dr. D. Culver (effective January 1, 1972), Dr. P.A. Raudzens (effective January 1, 1972).

Resignations: Dr. M.P. Davies (effective December 31, 1971), Dr. P.R. Ramachandran (effective June 30, 1972).

PUBLICATIONS

- Britt, B.A., Kalow, W. and Endrenyi, L. "The Effects of Halothane and Methoxyflurane on Rat Skeletal Muscle Mitochondria" (*Biochemical Pharmacology*, vol. 21, 1972, pp. 1159-69)
- Bryan, A.C., Mansell, A., and Levison, H. "Airway Closure in Children" (*Clinical Research*, vol. 19, Dec. 1971, p. 803)
- Bryan, A.C., Shulman, D.L. and Levison, H. "The Effect of Isoproterenol on Airway Closure in Healthy Adults" (*Clinical Research*, vol. 19, Dec. 1971, p. 805)
- Bryan, A.C., Laws, A.K., Levison, H., Mansell, A. and Lamarre, A. "Pulmonary Function in Experimental Pulmonary Oedema in Man" (*ASA Annual Meeting*, Oct. 1971, p. 219) (abstract)
- Creighton, R.E. (with Meridy, H.W.) "General Anaesthesia in Eight Patients with Familial Dysautonomia" (*Canadian Anaesthetists' Society Journal*, vol. 18, Sept. 1971, pp. 563-70)
- Creighton, R.E., Gray, E.G., Mitra, S.K., Nisbet, H.I.A. and Aspin, N. "Cerebral Blood Flow in Hypoxaemic Anaesthetised Dogs" (*Anaesthesia and Analgesia*, vol. 50, July-Aug. 1971, pp. 594-608)
- "The Effect of Methoxyflurane on Cerebral Blood Flow in the Dog" (*Canadian Anaesthetists' Society Journal*, vol. 18, 1971, pp. 408-18)
- "The Effect of Hypoxaemia on the Cerebral Blood Flow of the Dog under Methoxyflurane Anaesthesia" (*ibid.*, p. 419)
- Creighton, R.E., Relton, J.E.S., Steward, D.J. and Britt, B.A. "Malignant Hyperpyrexia: A Therapeutic and Investigative Regimen" (*Canadian Anaesthetists' Society Journal*, vol. 19, Mar. 1972, pp. 200-5)
- Davies, D.W. "The Effects of Adding a Positive Expiratory Pressure Plateau (PEPP) with controlled ventilation with a Bird Mark 7 or Mark 8 Ventilator" (*Canadian Anaesthetists' Society Journal*, vol. 19, May 1972, pp. 217-26)
- Desmond, J. "The Use of Micropore Filters in Continuous Epidural Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 19, Jan. 1972, pp. 97-100)
- Duffin, J. and Simpson, R. "An Inexpensive Thermistor Temperature Monitor" (*Canadian Anaesthetists' Society Journal*, vol. 18, Nov. 1971, pp. 691-3)
- "The Functional Organization of Respiratory Neurones" (*Canadian Anaesthetists' Society Journal*, vol. 19, Jan. 1972, pp. 1-7)
- Duffin, J. and Hockman, C.H. "Limbic Forebrain and Midbrain Modulation and Phase-Switching of Expiratory Neurones" (*Brain Research*, vol. 39, 1972, pp. 235-9)
- Evans, D. "The Effects of Closed Chest Veno-Arterial Bypass with Oxygenation on Cardiopulmonary Hemodynamics" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 62, July 1971, p. 76)
- "Support of the Circulation by Mechanical Means: A Review" (*Canadian Anaesthetists' Society Journal*, vol. 18, Nov. 1971, p. 637)
- Finlayson, D.C. "Fluid and Electrolyte Requirements during Anaesthesia and Surgery" (*Anaesthesia and Analgesia*, vol. 51, Jan./Feb. 1972, p. 69)
- Galloon, S. "Ketamine for Dilatation and Curettage" (*Canadian Anaesthetists' Society Journal*, vol. 18, 1971, p. 600)
- Gordon, R.A. "The Training of the Anaesthetist" (*Indian J. of Anaesthesia*, vol. 19, no. 4, Nov. 1971)
- Johnston, A.E. (with Calverley, R.K.) "The Anaesthetic Management of Tracheo-Oesophageal Fistula: A Review of Ten Years' Experience" (*Canadian Anaesthetists' Society Journal*, vol. 19, May 1972, p. 270)
- Laws, A.K., Levison, H., Mansell, A., Lamarre, A. and Bryan, A.C. "Pulmonary Function in Experimental Pulmonary Oedema in Man" (*ASA Annual Meeting*, Oct. 1971, p. 219) (abstract)
- Nisbet, H.I.A. "Humidification in a Semi-Open System for Infant Anaesthesia" (*Anaesthesia and Analgesia*, vol. 50, Nov./Dec. 1971, p. 999) (discussion)
- Nisbet, H.I.A., Levison, H. and Pelton, D.A. "Static Thoracic Compliance in Normal Children under General Anaesthesia" (*Acta Anaesthesiologica Scandinavica*, vol. 15, 1971, pp. 179-91)
- Nisbet, H.I.A., Pelton, D.A., Relton, J.E.S. and Levison, H. "The Effect of D-Tubocurarine upon the Static Elastic Recoil of the Thorax" (*Canadian Anaesthetists' Society Journal*, vol. 18, 1971, p. 304-9)
- Nisbet, H.I.A., Lamarre, A., Levison, H., Hall, J.E. and Relton, J.E.S. "Thoracic Elastance and its Components in Normal and Scoliotic Children" (*J. of Bone and Joint Surgery*, vol. 53, 1971, p. 199) (abstract)
- Noble, W.H., Samulski, H. and Ramaiah, S. "Unintended Exposure to Halothane in Surgical Patients: Halothane Washout Studies" (*Canadian Anaesthetists' Society Journal*, vol. 19, 1972, p. 35-41)

- Noble, W.H. and Severinghaus, J.W. "Thermal and Conductivity Dilution Curves for Rapid Quantitation of Pulmonary Oedema" (*Journal of Applied Physiology*, vol. 32, June 1972, pp. 770-5)
- Noble, W.H., Kronenberg, R.S., Safar, P., Lee, J., Wright, F., Wahrenbrock, E., Hickey, R., Nemoto, E. and Severinghaus, J.W. "Pulmonary Artery Pressure and Alveolar Gas Exchange in Man during Acclimatization to 12,470 Feet" (*Journal of Clinical Investigation*, vol. 50, 1971, p. 827)
- Noble, W.H., Severinghaus, J.W. and Catron, C. "A Focusing Electrode Bridge for Unilateral Lung Resistance" (*Journal of Applied Physiology*, vol. 32, 1972, p. 526)
- Pelton, D.A. and Finlay, J. "Needed: Error Prevention - Hospitals" (*JAHA*, vol. 45, part 1, Aug. 1971)
- Stoyka, W.W. "Cardiac Output Changes with Arterial Acid-Base States during Methoxyflurane Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 19, 1972, pp. 119-28)
- Tindal, S. "Intensive Care in the Neurosurgical Unit" (*Canadian Anaesthetists' Society Journal*, vol. 18, Nov. 1971, pp. 637-49)
- Tindal, S. (with McGuinness, J.B., Gillespie, F.C., Tilston, D., and Ledingham, I.Mc.A.) "Measurement of Cardiac Output by Constant Rate Infusion of Xenon-133" (*British Journal of Anaesthesia*, vol. 44, 1972, p. 19)

ANATOMY

Under the direction of Professor J.S. Thompson

Two developments, one concerning research and the other our relationship with clinical departments have highlighted the past year. In the first instance, the National Cancer Institute of Canada has recognized the unit, working under Dr. Axelrad in the Division of Histology, as a Research Group and has awarded them very significant financial support over a three-year period from April 1972 to March 1975. This means that the research in that Division, which is concentrated on the haematopoietic system and how differentiation in it is disturbed by virus-induced leukaemia, can be expected to flourish increasingly in the coming years.

The other development has been the greatly increased use made of the facilities and materials of the Division of Gross Anatomy by numerous clinicians who seek to develop teaching aids or perfect various techniques. At least a dozen such projects involving individuals from three clinical departments and four hospitals were initiated in the past year. We feel this liaison is to be encouraged as another concrete way in which the traditional gap between clinical and basic sciences can be bridged.

TEACHING

Undergraduate Teaching

The staff has continued to carry a heavy teaching load with the one new feature being the major change in the teaching to students in Rehabilitation Medicine. Students in the new degree programme in Rehabilitation Medicine now receive all the anatomy in one year (second year) of their programme. This meant that in 1971-2, the teachers in this area had to teach a full course to the degree students and also continue the teaching (for the last time) to the second-year students of the old diploma programme.

Our liaison with the clinical departments continued to benefit our undergraduate students. The medical students received instruction from hospital Residents in orthopaedics and otolaryngology who are seconded to the Department while students dissect areas of particular interest to them. In addition, members of the staff of the Department of Radiology instruct in the basic elements of radiological anatomy of the various regions of the body. Practising dentists and postgraduate students in Dentistry instruct dental students in their laboratories. Finally, members of the staff of the Department of Rehabilitation Medicine instruct students who take the courses for students in rehabilitation medicine in our Department. In all cases, these instructors bring to our students a lively knowledge of the importance of anatomy to their understanding of many clinical problems.

A list of the various undergraduate courses taught by the Department in 1971–72 and the total number of students taking each course follows. The wide variety of students served indicates the importance of a basic knowledge of anatomy to students in many undergraduate fields.

UNDERGRADUATE TEACHING IN 1971–1972

COURSE AND STUDENTS	NUMBER OF STUDENTS
<i>Gross Anatomy</i>	
Anatomy 200 (Arts)	126
Dentistry (1st year)	123
Dental Hygienists	52
Medical Students (1st year)	224
joined by Art as Applied to Medicine	5
Rehabilitation Medicine (degree course)	72
Rehabilitation Medicine (2nd year)	100
Speech Pathology and Audiology	16
Physical and Health Education (1st year)	85
joined by Nurses (1st year School of Nursing)	81
Physical and Health Education (2nd year)	87
<i>Histology</i>	
Medical Students (1st year)	224
joined by Art as Applied to Medicine	4
joined by Graduate Students	9
Rehabilitation Medicine (2nd year)	72
<i>Neuroanatomy</i>	
Medical Students (1st year)	224
joined by Art as Applied to Medicine	7
joined by special B & M group	33
Speech Pathology and Audiology	16
	<hr/>
	1,560

GRADUATE TRAINING

Members of the Department supervised graduate students proceeding towards graduate degrees in this Department and conducted courses taken by graduate students in this and other departments.

In the past year students completed graduate programmes and have graduated or will graduate this spring with the degrees noted:

Completed Ph.D.	1
Completed M.Sc.	2

Students presently registered in this Department (exclusive of those awarded graduate degrees this year) :

Ph.D.	4
M.Sc.	3
Postdoctoral	2

Formal Graduate Courses in 1971–2

COURSE	NUMBER OF STUDENTS
Growth, Constitution and Evolution	20
Exploration through Anatomy	9
Human Histology	9
Neuroanatomy	7
Advanced Neuroanatomy	15
	<hr/>
	60

POSTGRADUATE TRAINING

Many graduates in the Health Sciences return to take further training in various specialties. The Department of Anatomy offers many courses specifically designed for such individuals, many of whom are proceeding to certification or fellowship in the Royal College of Physicians and Surgeons of Canada.

<i>Postgraduate Teaching in 1971-2</i>	NUMBER OF STUDENTS
Postgraduate Therapeutic Radiology	6
Postgraduate Anaesthesia	16
Postgraduate Ophthalmology	8
Postgraduate Otolaryngology	4
Postgraduate Neuroanatomy	20
Postgraduate Dental-Embryology	6
Advanced Course in Surgery	46
Advanced Course in Obstetrics and Gynaecology	17
	<hr/> 123

In addition to the above formal courses, the staff supervised the training in anatomy of many postgraduate students who are training in various specialities in the different hospitals in Toronto. These students dissected the portions of the body appropriate to their specialties and instructed medical students on these same areas.

SPECIALTY	NUMBER OF POSTGRADUATE STUDENTS
Orthopaedics	5
Otolaryngology	5

The Department was happy to co-operate for a second year with the Department of Otolaryngology in providing space and materials for the section on anatomy in the intensive course in Rhinoplasty. Dr. R.G. MacKenzie of this Department was a member of the Faculty for this course and, for the course, produced a series of television programmes which have attracted many favourable comments. Already one complete set of the tapes has been sold to another University.

VISITORS

Distinguished visitors to the Department of Anatomy in 1971-2 included: Dr. R.A. Steeves, Roswell Park Memorial Institute, Buffalo, New York; Dr. S. Vesselinovitch, Cancer Research Laboratory, University of Chicago; Dr. Takeshi Odaka, Institute of Medical Science, University of Tokyo; Dr. Shozo Irino, Department of Medicine, Okayama University Medical School, Japan; Dr. Hans F. Stich, Cancer Research Centre, University of British Columbia; Dr. Maden Joneja, Department of Anatomy, Queen's University, Kingston, Ontario; Dr. G. Barski, Tissue Culture and Virus Laboratory, Villejuif, France; Dr. E.A. MacKinnon, Department of Anatomy, Queen's University, Kingston, Ontario; Dr. D.B. Stoltz, Cell Research Institute, University of Texas, Austin, Texas; Dr. I.H.M. Smart, Department of Anatomy, University of Dundee; Dr. G.E. Erikson, Division of Medical Science, Brown University; Dr. Boris Konkuov, Division of Genetics, Academy of Sciences, Moscow, U.S.S.R.; Dr. Maurice Marois, Professor of Histology, University of Paris, Paris, France.

RESEARCH

Dr. A.A. Axelrad and his colleagues, Drs. D.L. McLeod, V.I. Kalnins, W.M. Brown, and D.H. Cormack have formed a research group to study aspects of normal and abnormal haemopoiesis. Since this is a group project, it is difficult to delineate exactly the contribution of each member to it. Thus the following paragraphs make no attempt to outline the work of one individual but rather the work of the group as a whole.

The research efforts of the group are concentrated in two general areas: (1) to

determine the normal mechanisms that regulate differentiation and proliferation in the haemopoietic system and to understand how these mechanisms are altered in the course of leukaemic transformation; (2) to understand how the genetic constitution of the host determines resistance or susceptibility to murine leukaemia.

The plasma culture system developed in this Department has been adapted to the growth of adult human and murine haemopoietic cells and it is now possible to grow erythroid colonies under the influence of erythropoietin and granulocytic colonies under the influence of a granulopoietic factor in cell-conditioned medium.

Diffusion chambers implanted in the peritoneal cavity of irradiated rats are being used to determine the proliferative capacity of human haemopoietic cells. The study is directed towards establishing an assay system for human haemopoietic stem cells (CFU) and developing methods for cultivating them *in vitro*.

The ferritin labelled antibody technique is being applied to determine the distribution of normal surface antigens on cells at different stages of erythroid differentiation, and on Friend virus-infected erythroid cells. This may provide information on cell surface changes during erythroid differentiation and in Friend virus-induced erythro-leukaemia.

It has been found that there is a significant decrease in megakaryocytes and platelets in Friend virus-induced erythro-leukaemia. The methods used will now be applied to investigating changes in megakaryocyte and platelet counts in human leukaemia.

The second line of investigation has been directed towards elucidation of the genetic control of host response to Friend virus infection. Two congenic strains of mice developed by Dr. Axelrad have been shown to differ at two loci which operate in host cells to determine the response of these cells to infection by the Friend virus complex. Continuous cell lines from these congenic strains of mice have been used to investigate the genetic basis of resistance or susceptibility to infection by murine leukaemia viruses of different host ranges. The effect of the loci on the expression of endogenous leukaemia viruses in these cell lines is being studied in collaboration with Dr. Paul Sadowski of the Department of Pathology.

Dr. E.G. Bertram has continued his research in Neuroanatomy in two areas. He and Dr. Ian Robertson, a graduate student proceeding towards his Ph.D. degree, are studying the relationships between capillaries and neurons in various regions of the brain including the basal ganglia, diencephalon, and the brain stem. In this study, particular use is made of a modified Golgi technique as well as preparations using basic aniline dyes.

Dr. Bertram also continues his study on recurrent collaterals of the cerebral cortex in man. These collaterals course back and synapse on cell bodies or dendrites in the upper layers of the cerebral cortex.

Dr. W.M. Brown is a member of the research group, the programme of which is reported under Dr. Axelrad's name.

Dr. D.H. Cormack collaborates with the research group, the programme of which is reported under Dr. Axelrad's name.

Dr. J.W.A. Duckworth continues his research on the development of the human heart. In one of his projects, he has studied the various disorders of the development of the bulbo-ventricular loop in an endeavour to find a relationship between a series of disorders presently classified as separate entities.

Dr. Duckworth, with Mr. E. Busgrave, a graduate student, has initiated a study of the post-natal changes in the conducting muscle of the infant heart. This study will endeavour to relate changes seen in the conducting system of the heart to changes in the electrocardiograms of developing infants.

Dr. A.G. Erwin, together with Mrs. P. Rodney, has continued his study of improving methods of producing audio-visual aids for various areas of gross anatomy.

Mrs. P.G. Forkert has initiated a study on *hyperostosis frontalis interna*. She is endeavouring to relate these thickenings, which appear on the inside of the frontal bone, to the sex of the individual in order to determine if this indicator may usefully

be used in the determining of sex when studying archeological or anatomical remains. She has also, in collaboration with Dr. J. Davidson of the Department of Radiology, commenced a study of the lymph nodes as seen in specially injected specimens.

Dr. V.I. Kalnins is a member of the research group, the programme of which is reported under Dr. Axelrad's name. In addition to being a member of the research group, Dr. Kalnins continues the morphological studies on the centriole assembly in chick trachea. He has shown that late in ciliogenesis additional procentrioles are assembled in association with cylindrical structures at the basal ends of the previously assembled set of basal bodies. Such late assembly of procentrioles in association with recently matured basal bodies, other than diplosomal ones, has not been previously reported in vertebrates. Neither has it been previously observed in multiciliated cells of vertebrates. This late assembly provides additional procentrioles after the initial wave of assembly, induced earlier in clusters around the diplosomal centrioles, has been completed. If they mature and acquire cilia, they could add significantly to the total number of cilia formed in each cell. With Mr. John Marshall, studies utilizing E.M. autoradiography have been initiated to determine whether or not cells with single cilia or cells at various stages in ciliogenesis can synthesize DNA.

Dr. B. Liebgott has continued his study on the manner in which craniofacial characteristics are transmitted from parent to child and also continues his studies on the growth and development of children afflicted with Lateral Facial Dysplasia. He has recently completed his investigation of the skeletofacial factors which determine the anteroposterior relationship of the mandible and maxilla.

Dr. D.L. McLeod is a member of the research group, the programme of which is reported under Dr. Axelrad's name.

Dr. R.G. MacKenzie is making a special study of the development of the nasal capsule in the foetus. He is endeavouring to relate the development of the capsule to the structure and anomalies of the adult nose.

Dr. Carlton G. Smith has studied the architecture of the optic radiation in order to relate this structure to the defects of the visual fields that may be found following temporal lobectomy.

Dr. J.S. Thompson and Dr. A. Roberts have continued their research on the influence of genetic factors on the development of atheromata in inbred strains of mice. They have now shown that between two strains (the CBA/J and the C57BR/cdJ) following varying periods on an atherogenic diet, there is a statistically significant difference in serum cholesterol levels and in the severity of the atheromatous lesions that develop. The F1 (first generation) hybrids between the two strains show serum cholesterol levels and susceptibility to development of lesions between that of the two parent strains but closer to that of the resistant strain. The work is proceeding to determine the susceptibilities of the F2 and first backcross generations. When this stage has been completed, it should be possible to determine the type of inheritance (single gene or multifactorial) involved in the production of susceptibility or resistance to the development of atheromatous lesions in mice.

SCHOLARLY ADDRESSES

D. ELIGH (Introduced by A.A. AXELRAD), "Stimulation on Erythrocytic Colony Formation *in vitro* by a Factor in Erythrocytes," Canadian Federation of Biological Sciences, 1972.

A.G. ERWIN, "Audiovisual Aids," Faculty of Medicine, Memorial University, St. John's, Newfoundland, May 1972.

V.I. KALNINS, "Centriole Assembly during Ciliogenesis," Department of Anatomy, McGill University, 23 February 1972; "Assembly of Centrioles," Department of Microbiology, University of Hawaii, 29 March 1972.

V.I. KALNINS, C.K. CHUNG, and C. TURNBULL, "Late Assembly of Procentrioles in the Chick Trachea during Ciliogenesis," Canadian Federation of Biological Sciences, Quebec City, 1972.

S.K. LIAO and A.A. AXELRAD, "Colony Formation *in vitro* by FLV Infected Hemopoietic Cells," Canadian Federation of Biological Societies, Tumour Virus Workshop, Laval University, June 1972.

A. ROBERTS, "An Effect of Genotype on the Susceptibility to Atheromata Produced by Diet," Canadian Heart Foundation, Saskatoon, Saskatchewan, October 1971.

STAFF

It is with profound regret that we record the death on 24 January 1972 of Dr. Sylvia Bensley who had retired from her duties as Professor of Histology in 1969 because of ill health. She will be fondly remembered by generations of medical students and by the many members of the staff of this Medical Faculty with whom she worked since she joined the Department of Anatomy in 1948.

We are also saddened to report the death on 17 September 1971 of Professor Emeritus J.C. Watt who joined the staff of the Department of Anatomy a few years after receiving his M.D. degree from this University in 1918. He served the Faculty for over thirty years until his retirement in 1955 and his passing removes another individual who earned the affection and respect of scores of colleagues and of generations of students.

Professor Carlton G. Smith, who for many years has been the member of the staff in charge of Neuroanatomy, will retire from his duties to become Professor Emeritus at the end of the 1971-2 academic year. We wish to record our deep appreciation of his many years of service to the Department, to the Faculty and to the University as a whole.

Dr. J.K. Houston, who has served as Lecturer in the Department since 1968, has resigned to devote his full time to his practice in Orthopaedic Surgery.

PUBLICATIONS

Ham, A.W. and Harris, W.R. "The Repair and Transplantation of Bone"; in *The Biochemistry and Physiology of Bone*, 2nd ed., ed. G.H. Boune, vol. 3, pp. 337-99. New York: Academic Press 1972

Smith, C.G. *Basic Neuroanatomy* (2nd ed.). Toronto: University of Toronto Press 1971. Pp. 293

Stephenson, J.R., Axelrad, A.A. and McLeod, D.L. "Erythroid Nature of the Response to Friend Leukemia Virus Infection in Mice" (*Journal of the National Cancer Institute*, vol. 48, 1972, pp. 531-9)

ART AS APPLIED TO MEDICINE

Under the direction of Professor Nancy Joy

Ever since the programme was initiated in 1968, demand for the services of the Faculty of Medicine's B.Sc. Art as Applied to Medicine graduates has more than equalled the supply. Today most, if not all, graduates, including married women, are working in the profession and there is reason to expect that the five who graduate in June 1972 will also succeed in establishing themselves. In the opinion of the A.A.M. examining committee, no graduating group has had better grounding or produced more work of excellence both singly and in group projects throughout their course.

With the Division of Instructional Media Services now fully operational in the Medical Sciences Building, its staff who hold cross appointments in the A.A.M. Department have been better able to organize their applied art teaching and give to the students more direct and meaningful experiences. The availability of a supervised dark room in which third-year students have been able to apply photographic principles recently learned, has greatly strengthened the photography lecture course. The introductory course on Television Production and Graphics Design benefited noticeably

from experiences gained last session when the course was first offered, and from work of a 1971 summer student who was employed to test the range and performance capabilities of the I.M.S. television equipment in broadcasting of black and white and colour art work. A videotape programme designed by students to the specifications and satisfaction of Dr. J.A.S. Smith was the result.

For what proved to be one of the most popular projects with the students, Miss Margot Mackay made use of the opportunity provided by her role of art director and illustrator for a book, under the joint authorship of Dr. Leibel and Dr. Wrenshall, which was published to commemorate the fiftieth anniversary of the discovery of insulin, to design an illustrated lecture series on the making of a book. Beginning with the idea outlined on the drawing board and in a pencil script, she followed the development through all the stages of typography design and printing, to the final bound and inscribed copy. This required considerable assistance from the University of Toronto Press, whose imaginative and generous help was appreciated not only by Miss Mackay, but also by the A.A.M. students who visited the Downsview plant to see the printing process at first hand and to talk personally to typographers and printers.

A grant from the Atkinson Foundation will make it possible for two 1972 summer students to build a three-dimensional model demonstrating Neural Pathways of the Limbic Lobe in the Central Nervous System, which was designed as a classroom project under Mrs. Bridget Hough and Dr. Ken Livingston's supervision during the session.

Third-year students, working with Dr. Phil Watson, produced a six- or seven-minute animated sequence to demonstrate the function of the mandibular joint and the excursions of the mandible in chewing. This project revealed the students' knowledge of tooth form and function so well, it was accepted in lieu of a final examination. The animation was made possible by an arrangement with Mr. R. Rigelhof, Director of the Graphic Department of Scarborough College, where an animation stand, and supervision and instruction in its use, were provided. Mr. Rigelhof's exceptionally well-organized department always impresses students and will be a beneficial influence later when they come to plan their own.

Professor Gerald Hodge, the director of the School of Medical Illustration at Ann Arbor, Michigan, held a week of workshop classes in the A.A.M. Department, which the students requested be extended to a two-week period if they are repeated. He made a number of useful suggestions and comments on the evaluation of art student work. This year the increasingly widely used system of student critiques at which one student at a time presents work to a group of staff and other professionals for criticism, discussion, and evaluation, has been experimented with and its favourable reception will encourage greater use next session.

A series of ten sessions was arranged for third-year students to meet administrators working in various areas of importance to medical illustrators. In particular, we are grateful to Dr. N.W. Bradford, Medical Director of Sunnybrook Hospital for conducting a useful interview at which he outlined for the students the relationship of Mrs. Eila Ross's Department of Medical Illustration to the medical teaching and the administrative structure of the hospital. Mr. Keith Bowler gave a similar talk for the Medical Sciences Building and Mr. Ted Polford of the Macmillan Co. of Canada spoke to them on publishing practices and contracts.

At the 1972 Spring Convocation, the hood specially designed for the B.Sc.A.A.M. programme will be worn for the first time.

In July 1971 the Film Listing prepared by the A.A.M. Director for the Health Science Film Festival and Work Shop of the previous April was used by Dr. C. Alter in designing self-study sessions for summer courses offered by the Division of Postgraduate Medical Education. He found it to be the only comprehensive list in existence of medical films made at the University of Toronto.

In February 1972 two special showings of the first release print of Dr. A.M. Rappaport's film "Microcirculation of the Mammalian Liver," were arranged by the A.A.M. Department which has a special interest because much of the organization and all the art work and the animation was contributed by staff and students.

PUBLICATIONS

- Cousins, G. and Gilder, R. *Gentamicin Assay*, 1 inch colour video tape, 12 mins. Produced by Art as Applied to Medicine and Instructional Media Services, Toronto. Publisher Instructional Media Services 1972
- Mackay, M. (designer and illustrator) Film and Exhibit, *Removal of Acoustic Neuroma through the Posterior Fossa*, Medical authority: Dr. T.P. Morley, Toronto 1971
- Mackay, M. (designer and illustrator), Leibel, B.S. and Wrenshall, G.A. *Insulin*. Toronto: University of Toronto Press, for Canadian Diabetic Assoc. 1971. Pp. 46

BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH

Under the direction of Professor I.B. Fritz

Primary efforts within BBDMR were directed towards research in the area of metabolic control. A summary of specific research activities and a list of associated publications are submitted separately. Levels of research support, particularly from the MRC, continued to be adequate, but the rates of expansion within BBDMR were necessarily dampened by the general restriction in availability of research funds. Fortunately, this has not altered the quality of research productivity which has been well sustained.

The seminar programmes remained very active during 1971-2.

Staff Changes

During this year, Professor James Felts resigned because of exacerbation of his coronary symptoms by the climate. He moved to San Francisco to become head of a cardiovascular lipid unit at the Veterans Administration Hospital, and to accept a joint appointment in the Cardiovascular Research Institute at the University of California Medical School. His postdoctoral Fellow, Dr. L. Rudel, accompanied him. Dr. P.T.S. Wong, Lecturer, also resigned to accept a post in the Canada Centre for Inland Waters. Several postdoctoral fellows completed their fellowships in the BBDMR during 1971-2: Dr. J.T. Brosnan left to become an assistant professor at Memorial University at St. John's, Nfld., in the Department of Biochemistry; Dr. T.J. Delahunty accepted a postdoctoral fellowship in Dublin; Dr. V.L.W. Go accepted an associateship as an independent investigator at the Mayo Clinic, Rochester; Dr. C.R. Liang accepted a post in the Department of Biochemistry at the University of Western Ontario; and Dr. P. Silpananta resigned to become married prior to journeying to Australia. Three visiting scientists returned to their home bases (Dr. P. Mayes to the Royal Veterinary College at London, and Drs. H. Kern and C. Heuck to Heidelberg University).

During the year, three students completed all requirements for the Ph.D. degree under the direction of thesis advisors at BBDMR: Mr. B. Holub, Mr. D. Gornall, and Miss M. Moule.

New postdoctoral fellow appointments included Dr. Y. Tsuda, the first recipient of a C.H. Best Foundation Fellowship; Dr. N.E. Medveczky (MRC Fellowship), and Dr. J.P. Van Der Meer (NRC Fellowship). Dr. R.G. Vernon was promoted to Research Associate after having completed three years as a postdoctoral Fellow.

Dr. C.J. Ingles joined the Department as an assistant professor in October 1971. Dr. Leo Lee was promoted from Lecturer to Assistant Professor. Three professors were granted tenure: Drs. A. Goodridge, D. MacLennan, and C.C. Yip. Two professors received renewals of MRC associateships: M.C. Ganoza and A. Kuksis.

Status in the School of Graduate Studies

Because of the prevailing attitude towards numbers of graduate students in biological sciences, the SGS deemed it advisable not to attempt at this time to grant approval to the BBDMR request for autonomous departmental standing within SGS. Instead, each

appropriate staff member is appointed to sgs either within an existing department or as a member at large. This allows staff members to serve on Ph.D. committees as voting members. However, it is not conducive to the building up of a strong graduate programme within BBDMR. Many of the staff, including the Chairman, feel this is most unfortunate for the welfare of the students, who have missed opportunities, and for those staff members who would welcome accepting the responsibility of supervising the research and educational activities of students working towards the Ph.D.

The staff continued to offer the sequence of graduate courses in Metabolic Control. During 1971–2, a two-semester course in Principles I was given, but official attendance remained low, with only six registered students. In view of these circumstances, the staff members wish to expand postdoctoral and postgraduate programmes more aggressively and attempt to build a more suitable base for the graduate programme in the interdisciplinary area of metabolic control.

RESEARCH

(1) The synthesis of phospholipids, phosphonic acid analogues of phospholipids and carbohydrate metabolites was continued by Professor E. Baer and Dr. S.K. Pavanaram (L- α -phosphatidyl-O-(N-2-hydroxyethyl)alanine; Dr. H. Basu (α -octadecyl- β -hexadecanoyl-L- α -glyceryl-2-aminoethylphosphonate); and Dr. R. Robinson (D1-glyceraldehyde-3-phosphonate, dihydroxyacetone-phosphonate, 2,3-diphosphono-D-glyceric acid, glycerol-1,3-diphosphonate). The staff was ably assisted by Mr. H.H. Flehmig.

(2) Professor Dmytro Buchnea and his technician, Mr. J.K. Choi, continued the synthesis of mixed fatty acid, saturated and polyunsaturated diglyceride enantiomers. He has developed a procedure for the synthesis of all four isomers of glycerol-cyclic phosphodiester and acyl-glycerol-cyclic phosphodiester, which proved to be of biological and biochemical significance.

(3) Research activities in the section headed by Professor Irving B. Fritz may be divided into two main categories: (a) the control of fatty acid oxidation and fatty acyl group translocation across mitochondrial membranes; and (b) the hormonal control of spermatogenesis. During 1971–2, activities in the first category were being phased out, while research on spermatogenesis was being augmented.

A. Fatty Acid Metabolism: (i) Dr. Sean Brosnan completed studies on the functional activities of carnitine palmitoyltransferase in heart mitochondrial preparation from foetal and adult cows and rats. In addition, he examined the penetrability of carnitine and acetylcarnitine past mitochondrial membranes, and worked in collaboration with Mrs. B. Kopec in an investigation of the localization of carnitine palmitoyltransferase on inner membranes of liver mitochondria.

(ii) Mrs. B. Kopec completed her purification studies of carnitine palmitoyltransferase I (CPT-I) and investigated the properties of this enzyme. In addition, she analysed the conversion of this enzyme to a transformed enzyme (CPT-II) having different catalytic properties, and successfully prepared antibodies to each enzyme. These antibodies were invaluable in permitting fine localization of CPT on inner membranes of calf liver mitochondria (see above).

(iii) Dr. Leo Lee continued investigations on factors controlling ketogenesis, and completed studies demonstrating that the most important single determinant was the ratio of acetyl CoA to CoASH levels in isolated rat liver mitochondria.

(iv) Studies were performed in conjunction with the laboratory of Dr. Mitch Halperin on factors controlling malate and transport exit from rat liver mitochondria. It was shown that methylmalonic acid, which accumulates in patients suffering from an inborn error of metabolism when the mutase converting methylmalonyl CoA to succinyl CoA is missing, is capable of inhibiting malate exit. This might contribute to the hypoglycaemia seen in these patients, since malate exit from liver mitochondria is required for glucose production. In another investigation, it was shown that low concentrations of palmitoyl CoA competitively inhibit citrate exit dependent on citrate exchange across rat liver mitochondria. This may be of considerable physiological

importance in facilitating interpretation of the inhibition of fatty acid synthesis in conditions associated with elevated levels of palmitoyl CoA in liver.

B. Spermatogenesis: (i) Dr. J. Dorrington demonstrated that FSH (follicle stimulating hormone) increased adenyl cyclase activity in isolated seminiferous tubules freed of Leydig cells. She has succeeded in obtaining a responsive cell preparation after enzymatic treatment of the tubules. Luteinizing hormone was without effect in these preparations. This is the first reliable *in vitro* assay for FSH reported in testicular preparations.

(ii) Dr. C.H. Lin investigated the relative abilities of spermatogonia-rich *vs.* spermatocyte-rich *vs.* spermatid-rich populations to oxidize palmitate and pyruvate, and to produce ketones. These data were correlated with the distribution of carnitine acetyltransferase (CAT) in these cells in efforts to elucidate functions of CAT in testis.

(iii) Dr. N.E. Medveczky initiated investigations on the blood-testis barrier by examining the permeability of the basement membrane of the seminiferous tubule to various amino acids and some sugars in comparison with the uptake of these substrates by various germinal cell populations. It appears that the tubular basement membrane is more restrictive than the plasma membranes of various cells examined.

(iv) Drs. Leo Lee and C.H. Lin investigated the properties of lysosomes and lysosomal membranes from various testicular cells in an examination of the possible mechanisms by which elevated temperatures result in a cessation of spermatogenesis following damage to particular rat testis germinal cells (spermatocytes and spermatids). Dr. Lee succeeded in demonstrating that lysosomes from these cells are more temperature sensitive than lysosomes from liver.

(v) Dr. R.G. Vernon continued his investigations on the hormonal control of spermatogenesis, with emphasis on the action of testosterone. He succeeded in demonstrating the presence of a high affinity binding protein in tubules from adult rat testis, and has characterized the kinetic properties. In addition, he has examined the possible conversion of cholesterol to pregnenolone in these preparations, thus far without being able to demonstrate the presence of a desmolase.

(vi) In conjunction with Dr. V.L.W. Go and Mr. E. Whitter, studies were completed on the nature of intercellular testicular bridges in normal and hypophysectomized rats given various treatments. Papers which describe these and other results on the minimal number of hormones required during the various cycles of the seminiferous epithelium to restore spermatogenesis in hypophysectomized rats were completed for submission.

(4) In the past year, Dr. M.C. Ganoza and her laboratory have contributed the following new information to the mechanisms that regulate translation of the genetic code: (i) they have purified extensively the soluble protein factor X, previously discovered in this laboratory, and have found that in the absence of this polypeptide translation is arrested because of a defect in translocation of various amino acyl tRNA's. During extensive purification of X, a small fragment of as yet undefined amino acid composition was separated from the factor X. This fragment (coupling factor) appears to link the translocation protein X to other components of translation. The latter complex is the functional intermediate in the translocation of most amino acyl tRNA's on ribosomes. It is not known yet whether the polypeptide G, known to also participate in translocation, is also part of this complex. (Manuscript in preparation.) (ii) Biochemical and genetic evidence gathered in this laboratory indicates that a new protein factor (the rescue protein) is required for the termination of protein synthesis *in vivo* and *in vitro*. Recently we have partially purified this factor and shown that it is a protein having a molecular weight of 96,000 daltons. We find also that a conditional lethal mutant defective in this factor is unable to re-initiate protein synthesis. These and other observations suggest strongly that this polypeptide factor may play a critical role not only in normal chain termination but also in regulating cistron selection. (Manuscript in preparation.) (iii) It has been so far believed that peptide bond formation occurs by a concerted reaction in which the amino acid of an incoming amino acyl tRNA attacks the ester linkage of the nascent peptidyl tRNA on ribosomes.

We have isolated and purified a protein (hydrolase) which both cleaves the ester linkage in analogues of peptidyl tRNA and stimulates synthesis of peptide bonds. This observation opens the way to a molecular analysis of the function of each protein in the 50S subparticle of ribosomes. (Manuscript in preparation.)

(5) During the past year, Professor A.G. Goodridge and his staff have continued to study the regulation of fatty acid synthesis during development. Their experimental system is the liver of embryonic and growing chicks. Principal emphasis this year has been towards elucidation of the mechanism whereby certain simple carbohydrates stimulate fatty acid synthesis in isolated liver cells from neonatal chicks. Glucagon and exogenous free fatty acids inhibit and insulin stimulates fatty acid synthesis in these cells. Regulation appears to be exerted at the acetyl coenzyme A carboxylase level. Long-chain fatty acyl coenzyme A acts as an inhibitor and citrate as an activator. Also, esterification of long-chain fatty acyl coenzyme A may influence the concentration of this fatty acid synthesis inhibitor. Simple carbohydrates appear to stimulate fatty acid synthesis by increasing the extramitochondrial citrate concentration and by providing α -glycerophosphate for esterifying long-chain fatty acyl coenzyme A. In analogy to the situation in adipose tissue, glucagon and insulin may function as modulators of the long-chain fatty acyl coenzyme A concentration by regulating the activity of a hormone-sensitive lipase. Free fatty acids also appear to function via effects on the intracellular concentration of long-chain fatty acyl coenzyme A.

Preliminary experiments have continued on the development of a primary culture of liver cells which will exhibit adaptive enzyme changes similar to those observed *in vivo*. Results to date have been very encouraging; the cells survive in culture for at least 9 days, and both fatty acid synthetase and malic enzyme can be induced under conditions which lead to the loss of activity of NADP-linked isocitrate dehydrogenase and lactate dehydrogenase. This is the pattern which normally occurs in neonatal chicks when they are fed.

(6) The research in Professor C.J. Ingles' laboratory is directed towards an elucidation of the biochemical mechanisms regulating the expression of genetic information in eukaryotes. The process of gene transcription, specifically, the role of the enzyme(s) RNA polymerase in mediating selective gene transcription is being studied. Techniques are being developed for an examination of transcriptional controls operative in liver cells and during the developmental transitions accompanying spermatogenesis.

(7) Professor A. Kuksis has continued work on metabolism of glycerides, phosphoglycerides, and other complex lipids. Of great interest was the demonstration of a conversion of dienoic into tetraenoic species of monophosphoinositides of rat liver *in vivo*. The observation suggests similar types of transformations in other glycerophospholipids and in other tissues (in collaboration with B.J. Holub). Biosynthesis of lecithins in rat intestinal mucosa was shown to be inhibited by Puromycin. The resulting impairment in chylomicron formation could be attributed at least in part to lack of lecithin for membrane synthesis, as could be the fatty gut produced by bile diversion, in which case supplementation with lecithin or choline led to a prompt resumption of chylomicron synthesis and fat clearance (in collaboration with P.J.A. O'Doherty). In other series of experiments, lipoprotein lipase was shown to attack preferentially the 1-position of sn-glycerol trioleate and other synthetic triglycerides of known structure (in collaboration with Dr. N. Morley), and sn-glycerol-1,3-cyclic phosphate and its acyl esters were demonstrated to serve as substrates and potential competitive inhibitors for cyclic 3',5'-nucleotide phosphodiesterase (in collaboration with Dr. D. Buchnea).

(8) In Professor J. Logothetopoulos' laboratory, the metabolic adaptations of the pancreatic beta cells and the rates of insulin biosynthesis and secretion are being studied after prolonged functional stimulation or inhibition.

(9) During the past year, resolution and characterization of sarcoplasmic reticulum proteins was continued in Professor D.H. MacLennan's laboratory. A proteolipid was discovered, purified, and characterized with respect to size, lipid and amino acid content. Three acidic proteins were recognized and partially purified. All of the

acidic proteins were found to bind Ca^{++} ion. Reconstitution of Ca^{++} transport in preparations of sarcoplasmic reticulum partially depleted of acidic proteins was attempted with slight success.

(10) In Professor A. Marks' laboratory, the possibility of splitting the chromosome into its constituent functional units, genes, is being studied as a first step toward the chemical analysis of the base sequence of the hereditary material, DNA. The isolation of a single gene, 80 nucleotides long, coding for a specific transfer RNA, is a useful model system for the development of techniques for gene isolation. Hybridization of tyrosine transfer RNA with the DNA of the transducing bacteriophage $\Phi 80\text{psu} \frac{+}{\text{III}}$ which carries a gene coding for tyrosine transfer RNA, and subsequent enzymatic digestion, permits an experimental approach to the problem of isolation of a single gene.

(11) Research in the following directions is continued in Professor S.S. Mookerjee's laboratory: (a) Methods are being developed for studying the control of plasma lipoprotein synthesis in cell-free preparations and in isolated cells of rat liver. Nucleotide-sugar precursors (N-acetylglucosamine and galactose) are incorporated into lipoproteins released from the microsomal membrane preparations. Addition of a lecithin regenerating system (CDP-choline) stimulated the glycosylation of lipoproteins (in collaboration with Dr. T.J. Delahunty and Miss J.D. Nelson). (b) A survey of the levels of nucleotide-sugar: glycoprotein sialyl- and N-acetylglucosaminyl transferases in normal and pathological sera of adults and children revealed that these enzyme levels were increased in patients with various liver diseases. There was also some increase in the enzyme levels in cystic fibrosis, asthma, and infections but not in leukaemia and other neoplastic disorders. (c) Studies on the mechanism of action of CDP-choline on the process of glycoprotein synthesis showed that CDP-choline and Triton stimulated the N-acetylglucosaminyl and galactosyl transferase enzymes in a synergistic manner, suggesting a membrane involvement of the reaction (in collaboration with Mr. D.E.C. Cole, B.Sc. [Biol. and Med. Sci.] 1972). Further work in elucidating a physiological role of CDP-choline in the control of glycoprotein synthesis is in progress.

(12) In Professor F.S. Rolleston's laboratory, the question of how certain proteins are synthesized on selected groups of ribosomes (free or membrane bound) remains central to the research. From research in the last year, the conclusion has been reached that selective binding of ribosomes to membranes does not provide the mechanism for functional specificity.

It has been shown that: (a) in confirmation of the work of others, stripped RER binds ribosomes, whereas native RER and stripped or native SER do not – binding reported by others to SER membranes is very different in response to pH and ionic strength and can be regarded as non-specific; (b) 60S ribosomal subunits bind to RER membranes, whereas 40S subunits do not. Binding of 40S subunits to membrane-60S complexes is however very efficient; (c) polysomes also bind efficiently to RER membranes; and (d) no preferential binding to RER membranes of ribosomes, polysomes, or subunits isolated from RER as opposed to free ribosomes was seen, despite testing under a wide variety of conditions. Reports by others of preferential binding to membrane preparations of polysomes isolated from RER as opposed to free polysomes have been contradicted by work in this laboratory.

Work is now progressing on attempts to programme membrane bound and free ribosomes with messenger RNA fractions, and to identify specific proteins made by immunochemical means, so as to reconstruct *in vitro* a protein synthetic system that will show the selectivity seen *in vivo*.

(13) The research in Professor B.P. Schimmer's laboratory is directed towards identifying the sites and mechanisms of hormone action in differentiated cells. Under current examination are: (a) the nature of the interaction of adrenocorticotrophic hormone with its specific receptor in adrenocortical cell cultures; and (b) the nature of the interaction of catecholamines and lithium ions on adenylate cyclase from glial cell cultures.

(14) In experiments done by Professor G.A. Wrenshall's group, the turnover rate of plasma urea nitrogen (PUN) traced with ^{14}C urea, was $93 \pm 4\%$ of the measured total urinary nitrogen excretion rate. At 0, 3, 10, and 14 days of fasting, none of 3 male dogs run at 77 m/min showed the marked decrease during running in the rate of excretion of urinary nitrogen reported for the fasting catheterized female dog (J. Biol. Chem. 77:603, 1928). In collaboration with Dr. M. Vranic and his group of the Department of Physiology, it has been found, using a primed infusion of 1- ^{14}C glucose in 5 normal male post-absorptive dogs, that the rates of glucose production (R_p) and utilization (R_u) increased equally during treadmill running at 128 m/min. In the same 5 dogs, depancreatized and resting, a constant BASAL intraportal infusion of insulin produced normoglycaemia. Running caused R_p to exceed R_u (hyperglycaemia), but PUN was unaffected. With a multi-BASAL infusion of insulin alone, R_p was unchanged, while R_u increased (hypoglycaemia). The same multi-BASAL insulin infusion plus 16 nanogm/kg min of pancreatic glucagon gave results comparable with the normal dog. Thus pancreatic glucagon appears to be related to insulin during running in the dog.

(15) Research carried out in Professor C.C. Yip's laboratory during this period may be summarized as follows: (a) ^3H -insulin has been obtained from the mild catalytic tritiation of bovine single-chain proinsulin. The radioactive hormone is biologically active and has high specific radioactivity. Experiments were conducted to study the interaction between ^3H -insulin and purified plasma membrane from rat liver. The binding of ^3H -insulin to the plasma membrane receptors was found to be very rapid with the maximal binding achieved in less than 5 minutes at 0°C . This was in contrast to the relatively slower rate of binding when ^{131}I or ^{125}I labelled insulin was employed under the same conditions. The hormone-receptor binding was specific, except for the inhibitory effect observed with glucagon. This last observation may be important in understanding the antagonistic effect between insulin and glucagon in the control of liver metabolism. (b) A precipitating antibody preparation against homogeneous pure guinea-pig insulin was obtained from rabbit. The antiserum was able to neutralize the biological activity of guinea-pig insulin but not that of bovine insulin. The biological potency of guinea-pig insulin has been established in several systems. In the guinea pig itself, this hormone showed a potency of about 10 units/mg, one-half that of bovine insulin in the same animal. In fat-pad assay and rat-hemi-diaphragm assay, guinea-pig insulin showed a potency of about 2 units/mg, the same as that observed previously in mouse-convulsion assay. These observations suggest that in the guinea pig, its insulin receptor may be more "adaptive" or responsive to insulin of other mammalian species. The serum insulin levels in the guinea pig were determined by immunoassay using the potent antiserum. It was found that the fasting levels of serum insulin were between 10–40 ng/ml, ten to forty times higher than expected for other mammals. This high serum level may be required to compensate for the low potency of its own insulin. Glucose tolerance accompanied by measurement of serum insulin response showed the typical "prediabetic" response of the guinea pig. This may explain the observation that most guinea pigs develop spontaneous "diabetes" (glucosuria) with age. This aspect of the work has been done by Mr. A.E. Zimmerman, a candidate for the Ph.D. degree. (c) Experiments were constructed to prepare polysomes from foetal bovine pancreas. It was possible to obtain polysomes containing mostly monosomes, disomes, trisomes, and some higher polymers, in spite of the possible presence of RNAase activity. Immunoassay of the polysomal fractions showed that insulin was present mostly in the disome and trisome fractions, suggesting that the m-RNA for proinsulin may be associated with these fractions. Dr. Y. Tsuda, a post-doctoral fellow awarded the C.H. Best Foundation Postdoctoral Fellowship, has joined this laboratory and has begun experiments to isolate the m-RNA for proinsulin. An efficient assay system for m-RNA using the oocytes of *Xenopus laevis* has been successfully established in this laboratory. As a test, m-RNA for rabbit haemoglobin was isolated and purified from rabbit reticulocytes and was injected by micro-technique into oocytes. The injected oocytes were able to synthesize actively rabbit haemoglobin. (d)

Two human pancreatic islet adenoma tumours were obtained from patients in Toronto and were put into tissue culture in collaboration with Dr. B.P. Schimmer of this department. Analysis of serum proinsulin in this laboratory contributed to the diagnosis of one of the two cases. The tumour cells obtained from enzymic dissociation of the tumours were able to survive the culture conditions for more than 6 months. During this time, it was found that the tumour cells continued to synthesize and secrete proinsulin and insulin. The cells in culture also responded to the stimulation by C-AMP and tolbutamide in insulin secretion, but did not respond to glucagon or to high concentrations of glucose. These experiments were carried out with the aim of establishing an insulin-producing human islet adenoma cell line in culture.

HONOURS

PROFESSOR C.H. BEST was presented with the Order of the Companion of Honour by Her Majesty Queen Elizabeth II; first recipient of Brazil Biennial Award of the São Paulo Biennial Foundation; recipient of Gairdner International Award; received the honorary degrees of Doctor of Science from Laurentian University, Doctor of Medicine from the University of Ottawa, Doctor of Philosophy from the Hebrew University of Jerusalem; was elected an Honorary Member of the Hamilton Academy of Medicine, the Alumni Association of the University of Ottawa, and Honorary President of the Harvard-Joslin-Buenos Aires Course on Diabetes Mellitus.

PROFESSOR D. BUCHNEA was elected to the Fellowship of the Chemical Institute of Canada.

PROFESSOR I.B. FRITZ was Chairman of the MRC Grants Committee for Metabolism; Chairman of the Symposium on Insulin Action, 25–27 October 1971, arranged at Toronto in conjunction with the celebration of the 50th anniversary of the discovery of insulin, and edited the *Proceedings of the Symposium on Insulin Action* for publication; was Associate Editor, *Canadian Journal of Biochemistry*; was appointed External Senior Fellow, University of Michigan Society of Fellows, Ann Arbor, Michigan; was an invited participant in the Workshop on Spermatogenesis, June 1972, in conjunction with 4th International Congress of Endocrinology, Washington, D.C.; was invited Chairman of session on spermatogenesis, Gordon Conference on Hormone Action, Meriden, N.H.

PROFESSOR D.H. MACLENNAN was appointed Associate Editor of the *Canadian Journal of Biochemistry*.

SCHOLARLY ADDRESSES

E. BAER, "The Synthesis of Naturally Occurring Phosphonolipids," to the Golden Jubilee of the Department of Biochemistry, Indian Institute of Science, Bangalore, India.

C.H. BEST, "Summer of 1921," to the 50th Anniversary Insulin Symposium held by Eli Lilly and Co., Indianapolis; "The Discovery of Insulin," to the Postgraduate Course of The American College of Physicians, Indiana University School of Medicine; "The History of Insulin," to the Hebrew University of Jerusalem; "Experimental and Clinical Aspects of Insulin," to the Hadassah Hospital, Jerusalem; "Present Position of Insulin," to the Beilinson Hospital, Petah-Tikva, Tel Aviv; "Recollections of the Early Days of Insulin," to the New York Diabetes Association 19th Annual Symposium; "Perspectives: Past and Future," to the Symposium on Insulin Action, University of Toronto; "Reminiscences of 1921," lecture to the Gairdner Foundation, Toronto; "The History, the Discovery and the Present Position of Insulin," to the Pontifical Academy of Sciences, Rome; "Philosophy and Outlook," to the Symposium dedicating the City of Hope National Medical Center, Duarte, Calif.; "50 Years of Insulin," to the Fifth Annual Ernest C. Janes Memorial Lecture, Hamilton Academy of Medicine; "Insulin and Diabetes After Fifty Years," to the Medical Faculty, University of Rio de Janeiro.

D. BUCHNEA, "Synthesis of glycerol-cyclic phosphodiester," to the 11th Congress of International Society for Fat Research, Goteborg, Sweden.

I.B. FRITZ, "The Hormonal Control of Spermatogenesis," to the Gordon Conference on Hormone Action, Meriden, N.H.; "The Role of Carnitine in Fatty Acid Metabolism," to Canada Packers Ltd.; Toronto; "Hormonal Control of Spermatogenesis," to the Department of Biochemistry, University of British Columbia, Vancouver, and to the Department of Pathology, University of Washington, Seattle; "Factors Controlling Ketogenesis," to the Department of Pharmacology, University of Arizona, Tucson; "Possible Mechanisms of Fatty Acyl Group Transfer Across Mitochondrial Membranes," to the Departments of Medicine and Biology, University of California, San Diego, La Jolla; "Hormonal Control of Spermatogenesis," to the Canadian Society of Clinical Investigations, Toronto; "Control of Fatty Acid Oxidation," to the Symposium on Control of Intermediary Metabolism, Toronto Biochemical and Biophysical Society; "Integrative Aspects of Insulin Action," to the Symposium on Insulin Action, Toronto.

M.C. GANOZA, "The Functional Differences between Free and Bound Ribosomes in Hepatic Cells," to the Collège de Biologie Cellulaire, Université de Laval, Québec; "A Characterization of a Mutant Defective in Protein Chain Termination," to the Annual Meeting of the Federation of American Societies for Experimental Biology; "A Mutation Affecting the Termination and Initiation of Protein Synthesis," to the Toronto Biochemical and Biophysical Society.

A.G. GOODRIDGE, "Regulation of acetyl CoA Carboxylase by Palmitoyl CoA," American Society of Biological Chemists Annual Meeting, Atlantic City, N.J.

C.J. INGLES, "Eukaryotic RNA Polymerase," to the Departments of Botany and Zoology, University of Wisconsin, Madison, Wis., and to the Department of Medical Biophysics, University of Toronto.

A. KUKSIS, "Gas-liquid Chromatographic Fractionation of Seed Oil Diglycerides on Polyester Liquid Phases" and "Resolution of Intact Aminophosphatides by Argentation Thin-layer Chromatography," to American Oil Chemists' Society, Atlantic City, N.J., and Los Angeles, Calif., respectively.

D.H. MACLENNAN on "Resolution of Proteins of the Sarcoplasmic Reticulum," to the Federation of American Societies for Experimental Biology, and to the Cold Spring Harbor Laboratory Symposium on Quantitative Biology; "The Ca^{++} -dependent ATPase of Sarcoplasmic Reticulum," to the Gordon Research Conference on Proteins; "Resolution of Acidic Proteins of Sarcoplasmic Reticulum," to the International Study Group for Research in Cardiac Metabolism, Winnipeg, Manitoba.

S.S. MOOKERJEA, "Biosynthesis of Plasma Glycolipoproteins," to the Symposium on Plasma Lipoproteins, IXth Colloquium on Protides of Biological Fluids, Brugge, Belgium; "Effect of CDP-choline on the Complexing of Carbohydrate to β -lipoprotein in Rat Liver" (with co-author T.J. Delahunty), to the 14th Annual Meeting of the Canadian Federation of Biological Societies, Toronto; "Possible Role of Cytidine Diphosphate Choline in the Complexing of Carbohydrate to β -lipoprotein in Liver" (with co-author T.J. Delahunty), to the 519th Meeting of the Biochemical Society, Dublin, Ireland; "Stimulation of N-acetylglucosaminyl Transferase Activity by CDP-choline," to the Glycosaminoglycan-Glycoprotein Group, Rockefeller University, New York.

F.S. ROLLESTON, "Studies on the Mechanism of Functional Distinction between Free and Membrane Bound Ribosomes," to the Milton S. Hershey Medical Center, Hershey, Pa. and to the School of Medicine, University of Virginia, Charlottesville, Va.; "Redox States of Intra and Extra Mitochondrial Pyridine Nucleotides," to the School of Medicine, University of Virginia, Charlottesville, Va.; "Intermediate Concentrations and Metabolic Control," to the Toronto Biochemical and Biophysical Society Symposium on Metabolic Control; "Binding of Ribosomes to Endoplasmic Reticulum Membranes," to the Canadian Federation of Biological Sciences Meetings, Quebec.

B.P. SCHIMMER, "ACTH action on Adrenal Cells in Culture," to the Department

of Medicine, McMaster University; "Glycolipids of Clonal Lines of Transformed Mouse Fibroblasts and Adrenal Cells," to the Federation of American Societies for Experimental Biology, Atlantic City, N.J.; "Variations of Glycosphingolipids in Clonal Mouse Adrenal Tumor Cells in Culture," to the American Oil Chemists Society, Los Angeles, Calif.

C.C. YIP, "The Transformation of Proinsulin to Insulin," to the Fifth Canadian Hoechst Workshop on Diabetes, Mont Gabriel, Quebec; "Preparation of ^3H -insulin and its binding to liver plasma membrane," to the Symposium on Insulin Action, Toronto, Ontario.

STAFF CHANGES

Retirements

Dr. James Felts (Professor) retired to become Head, Cardiovascular Lipid Unit, Veterans Administration Hospital, with joint appointment in the Cardiovascular Research Institute, University of California Medical School, San Francisco.

Dr. L. Rudel (Postdoctoral Fellow) accompanied by Dr. Felts.

Dr. P.T.S. Wong (Lecturer) joined the Canada Centre for Inland Waters.

Postdoctoral Fellows who completed their fellowships in the BBDMR during 1971-2

Dr. J.T. Brosnan, became Assistant Professor, Dept. of Biochemistry, Memorial University, St. John's, Nfld.

Dr. T.J. Delahunty, accepted a postdoctoral fellowship in Dublin.

Dr. V.L.W. Go accepted an associateship as an independent investigator at the Mayo Clinic, Rochester, Minn.

Dr. C.R. Liang, accepted a post in the Department of Biochemistry, University of Western Ontario, London, Ontario.

Dr. P. Silpananta, resigned to be married.

Visiting Scientists Who Returned to Their Home Bases

Dr. P. Mayes, returned to the Royal Veterinary College, London, England.

Drs. H. Kern and C. Heuck, returned to Heidelberg University, Heidelberg, Germany.

New Appointments

Staff: Dr. C.J. Ingles joined the department in October, 1971 as an Assistant Professor.

Postdoctoral fellows: Dr. Y. Tsuda, first recipient of the Charles H. Best Foundation Postdoctoral Fellowship; Dr. N.E. Medveczky, MRC Fellowship; Dr. J.P. Van Der Meer, NRC Fellowship.

Promotions

Dr. Leo Lee, from Lecturer to Assistant Professor; Dr. R.G. Vernon, to Research Associate after completing three years as a postdoctoral fellow.

Tenure: Drs. A.G. Goodridge, D.H. MacLennan, and C.C. Yip were granted tenure during this academic year.

MRC Associateship Renewals: Drs. M.C. Ganoza and A. Kuksis received renewals of their MRC associateships.

Ph.D. Completions

Mr. B. Holub, Mr. D. Gornall, and Miss M. Moule.

PUBLICATIONS

Best, C.H. "Summer of 1921" (50th Anniversary Insulin Symposium) (*Diabetes*, vol. 21, supp. 2, 1972, pp. 385-95)

- "Recollections of 1921"; in *Impact of Insulin on Metabolic Pathways*. Jerusalem: Hebrew University-Hadassah, Medical School 1972
- "Perspectives: Past and Future"; in *Proceedings of the Symposium on Insulin Action*, ed. I.B. Fritz. New York: Academic Press 1972
- "Fiftieth Anniversary of Insulin" (*Modern Medicine of Canada*, vol. 26, 1971, pp. 7–11)
- Breckenridge, W.C. and Kuksis, A. "Stereochemical Course of Diacylglycerol Formation in Rat Intestine" (*Lipids*, vol. 7, 1972, pp. 256–9)
- Brosnan, J.T. and Fritz, I.B. "The Oxidation of Fatty-acyl Derivatives by Mitochondria from Bovine Fetal and Calf Hearts" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 1296–1300)
- "The Permeability of Mitochondria to Carnitine and Acetylcarnitine" (*Biochemical Journal*, vol. 125, 1971, pp. 94–5)
- Buchnea, D. "Synthesis of C-18 Mixed Acid Diacyl-sn-glycerol Enantiomers" (*Lipids*, vol. 6, 1971, pp. 734–9)
- Dorrington, J.H., Vernon, R.G. and Fritz, I.B. "The Effect of Gonadotrophins on the 3', 5'-AMP Levels of Seminiferous Tubules" (*Biochemical and Biophysical Research Communications*, vol. 46, 1972, pp. 1523–8)
- Fritz, I.B. "Insulin Actions on Carbohydrate and Lipid Metabolism"; in *Biochemical Actions of Hormones*, vol. II, ed. G. Litwack, pp. 165–214. New York: Academic Press 1972
- (ed. with Summary and Overview of the Integrative Aspects of Insulin Action) *Proceedings of the Symposium on Insulin Action*. New York: Academic Press 1972. Pp. 628
- "A Review of the Mode of Action of Insulin" (*Modern Medicine of Canada*, vol. 27, 1972, pp. 17–22)
- Fritz, I.B. (with Halperin, M. and Robinson, B.) "Effects of Palmitoyl CoA on Citrate and Malate Transport by Rat Liver Mitochondria" (*Proceedings of the National Academy of Science, U.S.*, vol. 69, 1972, pp. 1003–7)
- Fritz, I.B. (with Halperin, M.L., and Schiller, C.M.) "The Inhibition by Methylmalonic Acid of Malate Transport by the Dicarboxylate Carrier in Rat Liver Mitochondria" (*Journal of Clinical Investigation*, vol. 50, 1971, pp. 2276–82)
- Go, V.L.W., Vernon, R.G. and Fritz, I.B. "Studies on Spermatogenesis in Rats. I. Application of the Sedimentation Velocity Technique to an Investigation of Spermatogenesis; III. Effects of Hormonal Treatment on Differentiation Kinetics of the Spermatogenic Cycle in Regressed Hypophysectomized Rats" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 753–60; 768–75)
- Gornall, D.A., Kuksis, A., Pinteric, L. and Mookerjee, S. "N-Acetylglucosaminyltransferase Activity in Liver, Serum and Ovaries of Domestic Fowl" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 671–5)
- Holub, B.J., Breckenridge, W.C. and Kuksis, A. "Studies of Differential Turnover of Palmitoyl and Stearoyl Species of Glycerophosphatides using Labeled Unsaturated Fatty Acids" (*Lipids*, vol. 6, 1971, pp. 307–13)
- Holub, B.J. and Kuksis, A. "Differential Distribution of Orthophosphate-P³² and Glycerol-C¹⁴ among Molecular Species of Phosphatidylinositols of Rat Liver *in vivo*" (*Journal of Lipid Research*, vol. 12, 1971, pp. 699–705)
- "Further Evidence for the Interconversion of Monophosphoinositides *in vivo*" (*Lipids*, vol. 7, 1972, pp. 78–80)
- "Interrelationships in the Metabolism of Liver Arachidonoyllecithins and Plasma Cholesteryl Arachidonate in the Rat" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 1005–11)
- "Resolution of Intact Phosphatidylinositols by Argentation Thin-layer Chromatography" (*Journal of Lipid Research*, vol. 12, 1971, pp. 510–12)
- "Structural and Metabolic Interrelationships among Glycerophosphatides of Rat Liver *in vivo*" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 1347–56)
- Kopec, B. and Fritz, I.B. "Properties of a Purified Carnitine Palmitoyltransferase, and Evidence for the Existence of Other Carnitine Acyltransferases" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 941–8)
- Kuksis, A. "Gas-Liquid Chromatographic Fractionation of Natural Diglycerides on Organosilicone Polyester Liquid Phases" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 1245–50)
- "Gas-Liquid Chromatographic Fractionation of Natural Diglycerides on Stabilized Polyester Liquid Phases" (*Journal of Chromatographic Science*, vol. 10, 1972, pp. 53–6)
- "Ion Exchange Chromatography of Bile Acids"; in *The Bile Acids – Chemistry, Physiology and Metabolism*, vol. 1, ed. P.P. Nair and D. Kritchevsky, pp. 173–208. New York: Plenum Press 1971
- "Newer Developments in the Determination of Structure of Glycerides and Phosphoglycerides"; in *Progress in the Chemistry of Fats and Other Lipids*, vol. 12, ed. R.T. Holman, pp. 1–163. Oxford: Pergamon Press 1972
- "Progress in the Analysis of Lipids. IX. Gas Chromatography, Part II" (*Fette Seifen Anstrichmittel*, vol. 73, 1971, pp. 332–42)
- Lee, L.P.K. and Fritz, I.B. "Factors Controlling Ketogenesis by Rat Liver Mitochondria" (*Canadian Journal of Biochemistry*, vol. 50, 1972, pp. 120–7)

- MacLennan, D.H. and Wong, P.T.S. "Isolation of a Calcium-sequestering Protein from Sarcoplasmic Reticulum" (*Proceedings of the National Academy of Sciences, U.S.*, vol. 68, 1971, pp. 1231-5)
- Mookerjea, S. "Biosynthesis of Plasma Glycolipoproteins"; in *Proceedings of IXth Colloquium on Protides of Biological Fluids*, vol. 19, ed. H. Peeters, pp. 135-9. Oxford: Pergamon Press 1972
- Mookerjea, S., Cole, D.E.C. and Chow, A. "Glycoprotein Biosynthesis: Stimulation of Galactose Transfer from UDP-¹⁴C-galactose into Microsomal Protein by Cytidine-5'-diphosphocholine" (*FEBS Letters*, vol. 23, 1972, pp. 463-7)
- Rolleston, F.S. "A Theoretical Background to the Use of Measured Concentrations of Intermediates in Study of the Control of Intermediate Metabolism"; in *Current Topics in Cellular Regulation*, vol. 5, ed. B.L. Horecker and E.R. Stadtman, pp. 47-75. New York: Academic Press 1972
- Schimmer, B.P. "Adenylate Cyclase Activity in Adrenocorticotrophic Hormone-sensitive and Mutant Adrenocortical Tumor Cell Lines" (*Journal of Biological Chemistry*, vol. 247, 1972, pp. 3134-8)
- "Effects of Catecholamines and Monovalent Cations on Adenylate Cyclase Activity in Cultured Glial Tumor Cells" (*Biochimica et Biophysica Acta*, vol. 252, 1971, pp. 567-73)
- Silpananta, P. and Goodridge, A.G. "Synthesis and Degradation of Malic Enzyme in Chick Liver" (*Journal of Biological Chemistry*, vol. 246, 1971, pp. 5754-61)
- Vernon, R.G., Go, V.L.W. and Fritz, I.B. "Studies on Spermatogenesis in Rats. II, Evidence that Carnitine Acetyltransferase is a Marker Enzyme for the Investigation of Germ Cell Differentiation" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 761-7)
- Vernon, R.G. (with Walker, D.G.) "Glucose Metabolism in the Developing Rat. Studies *in vivo*" (*Biochemical Journal*, vol. 127, 1972, pp. 521-9)
- "Gluconeogenesis from Lactate in the Developing Rat. Studies *in vivo*" (*ibid.*, vol. 127, 1972, pp. 531-7)
- Yip, C.C. "A Bovine Pancreatic Enzyme Catalyzing the Conversion of Proinsulin to Insulin" (*Proceedings of the National Academy of Sciences, U.S.A.*, vol. 68, 1971, pp. 1312-15)
- "Proinsulin - the Precursor of Insulin" (*Modern Medicine of Canada*, vol. 26, 1971, pp. 20-3)
- Zimmerman, A.E., Kells, D.I.C. and Yip, C.C. "Physical and Biological Properties of Guinea Pig Insulin" (*Biochemical and Biophysical Research Communications*, vol. 46, 1972, pp. 2127-33)

BEHAVIOURAL SCIENCE

Under the direction of Professor R.F. Badgley

The Department's programme in its third year broadened the scope of its academic and research responsibilities and extended its liaison with other departments and community agencies. With few comparable settings having yet charted optimal courses, the Department's activities still remain somewhat fluid as co-ordination with other teaching systems emerges.

TEACHING

The development of a relevant and stimulating curriculum which is subsequently reinforced and engages active student participation is foremost among the Department's teaching objectives. Although not yet attained, changes during the year in the content and format of the curriculum have made the reaching of this goal more feasible. The Student-Faculty Advisory Committee to the Behavioural Science System reviewed what was being taught, as well as how instruction was provided. Where possible within the limits imposed by the size of the staff and the number of students, many of the recommendations, which were forthright and imaginative, were implemented.

Seeking to match staff capability with student training and interest, small group student projects were initiated on a pilot basis and subsequently were strongly endorsed by students. Supervised by a tutor, the approximately 40 projects undertaken by students relied on the assistance of several hundred clinicians, laymen and/or institu-

tions. The individuals contacted by students ranged from the Provincial Minister of Health to an Indian lay dispenser in northwestern Ontario. This taking of the student from the classroom into the community typically involved a detailed review of the literature, extensive contacts with patients and health personnel and an analysis of the issue's clinical, social, and ethical implications of the issue being studied. Covering a broad range of interests relating to the human life cycle or the health system in order to test or illustrate concepts and findings covered less fully in the formal behavioural science teaching programme, topics included: abortion, failure-to-thrive infants, developmental anomalies, perceptually handicapped children, the speed-using subculture, suicide, health problems of the aged, patient attitudes towards death, health care of minority groups, emergency room services, sectarian healers, and medicine and social policy. In an exploration of the reasons for the rapidly increasing demand for emergency room services, for instance, students interviewed many staff members and 175 patients at five teaching hospitals, accompanied ambulance attendants, sought to predict the sequence of road accidents from an aeroplane and filmed two creative videotapes. The findings of this student project as well as those of several other special studies were presented to the class as a whole, on grand rounds, and the staff of participating agencies.

The scope of interdepartmental and interfaculty teaching expanded during 1971-2. Over 30 guest lecturers participated in panels or seminars, approximately 125 physicians in eight teaching hospitals served as tutors for student field trips, and an equal number of individuals and/or institutions facilitated the completion of student projects. We gratefully acknowledge this assistance which was so generously extended.

In shaping the curriculum, close liaison was maintained with the staff of the departments of Family and Community Medicine, Paediatrics, Preventive Medicine, and Psychiatry. Several cross-appointments (eight) obtain between this staff and these departments which serve to foster and extend common academic interests. As a result of a two-day staff retreat held in conjunction with members of other departments, a more extensive two-way involvement can be anticipated in the future. Our aim is a more effective integration between academic systems, in what is taught, as well as a reinforcement in the areas concerned of what is learned throughout the four-year curriculum. It is intended, for instance, that in conjunction with the Department of Family and Community Medicine selected aspects of the social and psychological attributes of patients and their families which are presented in Period I will be re-introduced in selected Period III student-staff seminars.

Other teaching activities of the staff included: the supervision of eight student electives; participation on several occasions in hospital grand rounds and ward rounds; and seminars on psychological assessment and learning disabilities with Period III clerks. Instruction provided to students in other faculties in the university involved: School of Hygiene: Social-Cultural Aspects of Health and Illness (30 hours, 12 students); Faculty of Dentistry: Community Dentistry I (30 hours, 125 students); Hospital for Sick Children: Nurse-Practitioner Course - The Health of Indians (30 hours, 4 students); Department of Sociology: three undergraduate and/or graduate courses, M.A. and Ph.D. supervision (six students); Faculty of Pharmacy (third and fourth year students, 6 hours); and the School of Nursing (15 students, 3 hours).

In a joint programme between the Faculty of Dentistry and this Department, Murray Kronis, D.D.S., M.P.H., is pursuing an M.Sc., in Social Science and Dentistry. David Mandel, M.D., with support from the Medical Research Council is taking a Social Science in Medicine graduate degree under Professor Margot Jefferies at Bedford College, University of London. Special lectures or seminars were given by staff members to: the Hospital Administration Workshop, the Department of Urban and Regional Planning, the School of Library Science, School of Nursing, Toronto General Hospital, and various courses in the School of Hygiene.

While the philosophy is endorsed that teaching activities within the university should be closely integrated, the rapid growth and variety of teaching responsibilities

which has now been assumed or requested may require either a retrenchment of effort or an increase in staff complement. Two fields germane to this Department's goals, anthropology and economics as related to medicine, should be developed if students are to be appraised of the relevance of these fields to medical practice and the organization of health services. Limited instruction with the faculty on a guest lecturer basis or involving tutors in a handful of student projects is now provided.

STAFF

Engaged in a similar academic programme for the past seven years, Professor Reginaldo Zaccara de Campos, Ph.D., Faculdade de Ciencias Medicas, Universidade Estadual de Campinas, Brazil, was a Visiting Professor during the year. Appointments made to the staff included: Peter Kong-ming New, Ph.D., formerly of Tufts University School of Medicine, Professor; David Coburn, M.A., Lecturer; Charles T. Netley, Ph.D., Chief Psychologist, Hospital for Sick Children, Assistant Professor (part-time); Stanley C. Best, M.D., cross-appointment with the Department of Preventive Medicine, Associate; Murray C.L. Cathcart, M.D., of the Department of Family and Community Medicine, Associate; and Robert W. Morgan, M.D., Chairman of the Department of Preventive Medicine, Associate. Research Associates affiliated with on-going studies were John Court, Christopher Cromarty, Mary Haour, Gerald MacKay, Nancy Penny, David MacKenzie, and George Torrance. Ronald Cohen, Ph.D., Associate Professor, resigned to become Chairman, Department of Psychology, Glendon College, York University.

RESEARCH

Covering a range of studies examining the relationship of man, society, and health, members of the Department during 1971-2 were engaged in 20 research projects. Although this new field has little precedence in securing fiscal support in Canada, funding was provided by seven sources which included: The Canada Council; Department of Health, Province of Ontario; Department of National Health and Welfare, Ottawa; Medical Research Institute, Kaiser Foundation; National Research Council; Ontario Mental Health Foundation; and the u.s. National Center for Health Services Research and Development.

Psychological and Physiological Processes

Normal and aberrant psychological and developmental behaviour typically involving hospitalized patients was the focus of seven studies. In conjunction with the clinical staff of The Hospital for Sick Children, Dr. Netley is completing a longitudinal (to age 8), controlled investigation of the intellectual development of children who have suffered from serious diseases during the neonatal period. Dr. Netley is also analysing patients with perceptual and sensory motor abnormalities of interhemispheric communication found in agenesis and surgically separated callosal patients. Dr. Cohen is exploring how the retrieval of information may be related to differently phased stimuli. Dr. Goldsmith, focusing on the behavioural effects of cannabis saliva among infrequent and experienced users, is investigating the dose-response relationship between tetrahydrocannabinol and several psychophysical tasks. In a second study, Dr. Goldsmith is testing the temporal and ordinal relation between behavioural indices of memory and the physiological mechanisms which may mediate information storage and retrieval. The study deals with the behavioural function of cerebral RNA and protein synthesis and the effects on learning and memory of compounds which stimulate or inhibit these processes and the experimental production of anterograde and retrograde amnesia by electroconvulsive shock and drugs. In two studies dealing with the organization of behaviour in infants, Ilze Kalnins is studying: (i) the co-ordination of sucking and looking in response to sucking-produced changes in visual stimulation; and (ii) the

integration of reaching and looking in response to reaching-contingent visual stimulation.

The Health of the Community

How an individual's social circumstances or the extent to which he may be under stress influences his health behaviour is the focus of several studies. Seeking to establish a baseline of customary and/or counter-culture attitudes and behaviour among adolescents, Dr. M.J. Kelner, with Dr. E. Latowsky of York University, is assessing a sample of high school and university students in Toronto. As well, in a before-and-after analysis, Dr. Kelner is currently appraising the impact of change in physical and architectural surroundings on patients and staff of a large urban mental hospital as these individuals are transferred from old to new facilities. This longitudinal study is assessing the immediate as well as long-range effects of these changes. An analysis started by the late Helen B. Fritz with six medical students dealing with physicians' perspectives on abortion has been concluded by Dr. Kelner. All members of the Ontario College of Family Physicians were polled; a provincial sample of doctors was interviewed concerning the medical practice implications of this social issue. In three studies drawing upon a sample of 1100 male workers in Victoria, D. Coburn is: (i) reviewing the relationship between a job's complexity and extent of autonomy with a man's attitudes and behaviour toward child-rearing, preventive health activities, and political behaviour; (ii) comparing the health attitudes and behaviour of the Victoria labour force with a matched sample of workers in Portland, Oregon; and (iii) analysing the relation between a man's social circumstances, specifically aspects of his job and education, with what he thinks and does to protect his health.

Social Policy and Health Services

With N. Byrne of the Division of Studies in Medical Education, Robert Cohen is assessing the learning experiences and career choices of clinical clerks in two teaching hospitals. Intensive observation of student rotations in selected services has been augmented by a questionnaire sent to all such students affiliated with the Faculty. After reviewing the behavioural science in medicine programmes in several nations, R.Z. de Campos in collaboration with the Brazilian Association of Medical Schools has undertaken: (i) a review of the 152 Brazilian medical faculties' experiences in this new academic field; and (ii) an in-depth analysis of a cross-section of these programmes. In a study which has timely implications for Canada, P.K. New has completed an analysis of the impact of citizen participation in a number of neighbourhood health centres in the United States. Now in its second year, a longitudinal analysis of changes in the level of health, attitudes and behaviour of the Indian population in an area of approximately 200,000 square miles in northwestern Ontario, represents a joint project between this Department (R.F. Badgley) and the Department of Paediatrics (Dr. H.W. Bain) and Anthropology (Dr. R.W. Dunning). Undertaken in collaboration with the leaders of several communities and the staff of Medical Services of the Department of National Health and Welfare (Dr. Kenneth Butler, Director, Ontario Region; and Dr. G. Goldthorpe, Director, Sioux Lookout Health Zone), a baseline has been established in four communities relating to traditional versus western health values and behaviour, the demand and organization of health services, and reported salient population disease morbidities. With Dr. S. Wolfe of Meharry Medical College, R.F. Badgley has completed an analysis of the work of a group of Canadian doctors (1962-9). Cast in the context of implications for the Canadian health system, this study, to be published by the Macmillan Company of Canada and the Milbank Memorial Fund, New York City, is a detailed exploration of the doctor's job and of his social and clinical responsibilities. In a comparison of the Canadian and United States national health systems, George Torrance and R.F. Badgley, with Professor O.W. Anderson of the University of Chicago, are exploring the history, trends, and impact of universal health insurance in Ontario. The primary emphasis is on the development of health

policies, changes in the organization structure of health organizations, the professions, economic trends, and the use of health services.

VISITORS

R.L. Alfonso, M.D., Commissioner, Medical Care Commission, Manila, Philippines; Odin W. Anderson, Ph.D., Professor and Director, Center for Health Administration Studies, University of Chicago; Jaime Breil, M.D., Departamento de Medicina Social y Preventiva, Facultad de Ciencias Medicas Universidad Central, Quito, Ecuador; Fred Davis, Ph.D., Professor of Sociology, University of California Medical Center, San Francisco; M.G. Field, Ph.D., Professor, Russian Research Centre, Harvard University; Juan Cesar Garcia, M.D., Regional Advisor in Medical Education, Pan American Health Organization; Geoffrey Gibson, Ph.D., Assistant Professor, Department of Sociology, State University of New York (Buffalo); W.G. Goldthorpe, M.D., Director, Sioux Lookout Zone Hospital, Department of National Health and Welfare; Saxon Graham, Ph.D., Professor, Department of Sociology, State University of New York (Buffalo); Cristina Lodi Guedes, Ph.D., Departamento Medicina Preventiva y Social, Universidade de Minas Gerais, Belo Horizonte, Brasil; Basil S. Hetzel, M.D., Professor of Social and Preventive Medicine, Monash University, Australia; Carl E. Hopkins, Ph.D., Professor and Acting Dean, School of Public Health, University of California at Los Angeles; Raymond Illsley, Ph.D., Director, M.R.C. Medical Sociology Research Unit, University of Aberdeen; Herbert Ladd, Ph.D., Professor of Psychology, Loyola University; Ruth Landes, Ph.D., Professor, Department of Anthropology, McMaster University; Carlos A. Linger, M.D., Asociacion de Facultades Medicina Argentina, Buenos Aires, Argentina; Nina Pereira Nunes, M.D., Instituto de Medicina Social, Universidade Estado de Guanabara, Rio de Janeiro, Brasil; J.M. Reid, M.P., Rainy River-Kenora, House of Commons; Magdalena Sokolowska, M.D., Professor, Polish Academy of Sciences, Institute of Philosophy and Sociology, Warsaw, Poland; Ian Tait, M.B., Nuffield Travelling Fellow, Aldeburgh, United Kingdom; Cesar A.B. Vieira, Ph.D., Departamento Medicina Preventiva y Social, Universidade de Minas Gerais, Belo Horizonte, Brasil; Hannu Vuori, M.D., Ph.D., Visiting Professor of Public Health, Harvard University and University of Kuopio, Helsinki, Finland; Samuel Wolfe, M.D., Director, Office of Comprehensive Health, Meharry Medical College.

HONOURS

R.F. BADGLEY as a special consultant to Pan American Health Organization was Chairman of a session on Innovations in Latin American Medical Schools, III Meeting of the Health Sciences Education Information Center, Washington, December 1971; Member, Task Force on Treatment and Rehabilitation, Ontario Ministry of Health, 1972; Secretary, Committee on the Sociology of Medicine, International Sociological Association; and Chairman, Committee on International Medical Sociology, American Sociological Association.

D. COBURN is Chairman, Committee on the Future of Sociology in Canada, Canadian Sociological and Anthropological Association.

M.J. KELNER is a Member, Executive Committee, U.S. Association of Behavioural Science in Medicine; Dr. Kelner gave a well-received address at the XXV World Medical Association Assembly in Ottawa, September 1971.

P.K. NEW is a Consultant, Community Health Center Project, Department of National Health and Welfare.

SCHOLARLY ADDRESSES

R.F. BADGLEY, "The Sociology of the Medical School," American Sociological Association, Denver, September 1971; Chairman and Speaker, Innovations in Latin

American Medical Schools, III Meeting of Health Sciences Education Information Center, Pan American Health Organization, Washington, December, 1971.

ROBERT COHEN, "The Role of Behavioural Science in Medicine," Ontario Society for Geriatric Research.

M.J. KELNER, Chairman of Session and paper presented on: "Drug Users as People: Some Reflections on Youthful Drug Use," Canadian Learned Societies, St. John's, June 1971; "Socio-Economic Correlates of Psychotropic Drug Use," 25th World Medical Assembly, Ottawa, September 1971; "Toronto Elites," Society for Applied Anthropology Meetings, Montreal, April 1972.

C.T. NETLEY, "Primitive Adaptation and Visuo-Motion Skills in Children with Learning Difficulties," British Psychological Association, Exeter, United Kingdom, 1971.

P.K. NEW, discussant on "Social Class and Medical Care: An Empirical Case," American Public Health Association, Minneapolis, October 1971.

P.K. NEW (with E. Ricci), "Pathways to Health Care: Science or Faith," Society for the Scientific Study of Religion, Chicago, October 1971.

P.K. NEW (with R.M. Hessler and L.S. Kemnitzer), "Community Research, Research Commune?" Third Annual Environmental Design Research Association, Los Angeles, California, January 1972.

P.K. NEW (with R.M. Hessler), "Chinese and Western Medicine: Dual Medical Care Systems in Boston's Chinatown," Southern Anthropological Society, Columbia, Missouri, February 1972.

P.K. NEW (with W.E. Holton), "Citizen Participation in Mental Health Centers," Tennessee Mental Health Association, Gatlinburg, Tennessee, May 1972.

P.K. NEW (with S.S. Bellin), "Citizen Participation in Neighborhood Health Centers, Health Services and Mental Health Administration," Public Health Service, Washington, D.C., May 1972.

PUBLICATIONS

Badgley, R.F. "Group Medical Practice: A Sociological Perspective" (*Le Médecin du Québec*, vol. 6, 1971, pp. 84/604-87/607)

Badgley, R.F. and Bloom, S. "Sociology and Medical Education"; in *Behavioural Science Perspectives in Medical Education*, vol. 3, pp. 180-214. Washington: National Center for Health Services 1972

Badgley, R.F. (with Cohen, R.) "Dilemma in Innovation: The Medical Assistant's Role"; in *National Conference on Assistance to the Physician*, pp. 10-16. Ottawa: Information Canada 1972

Badgley, R.F. and Kelner, M.J. "Behavioural Science: The University of Toronto"; in *Behavioural Science Perspectives in Medical Education*, Vol. 2, pp. 116-30. Washington: National Center for Health Services 1972

Badgley R.F. (with Wolfe, S.) "Public Policy and Automated Multiphasic Health Testing and Services"; in *Automated Multiphasic Health Testing and Services*, Vol. 3, pp. 255-63. Washington, D.C.: U.S. Public Health Service 1972

de Campos, R.Z. (with Nuñez, E.D.) "O Ensino das Ciências Sociais no Currículo Médico: Um Programa Pioneiro" *Revista da Universidade Estadual de Campinas*, Numero Inicial, Dec. 1971

Kelner, M.J. "Drug Use among Youths in Toronto: Myth and Reality" (*Journal of the Medical Women's Federation*, vol. 54, Feb. 1972, pp. 30-5)

Kelner, M.J. and Latowsky, E. "Youth: The new Tribal Group"; in *Social Space: Canadian Perspectives*, ed. D.G. Davis and K. Herman, pp. 240-3. Toronto: New Press 1971

New, P.K. (with Bellin, S.S.) "Neighborhood Health Centers"; in *Urban and Regional Economics*, ed. Joseph E. Haring, pp. 165-7. Boston: Houghton Mifflin, 1972

New, P.K. (with Hessler, R.M.) "Demographic Context, Social Interaction and Perceived Health Status: Exedrin Headache #1" (*Journal of Health and Social Behaviour*, vol. 12, Sept. 1971, pp. 191-9)

——— "Research as a Process of Exchange" (*The American Sociologist*, vol. 7, Feb. 1972, pp. 13-14)

New, P.K. (with Hessler, R.M. and Kemnitzer, L.S.) "Community Research. Research Commune?"; in *Environmental Design: Research and Practice*, Proceedings of Environmental Design Research Association, vol. 2, ed. J. Mitchell, pp. 18-4-1 to 18-4-6. Jan. 1972

BIOCHEMISTRY

Under the direction of Professor G.R. Williams

The following numbers of students were registered in courses given by the Department of Biochemistry:

Faculty of Medicine (first professional year)	. . . . .	216
Faculty of Dentistry (first professional year)	. . . . .	125
Faculty of Arts and Science BCH 320	. . . . .	296
BCH 321	. . . . .	47
BCH 370	. . . . .	64
BCH 371	. . . . .	32
BCH 422, 424, 425, 426, 472, 473	. . . . .	157
Faculty of Food Sciences		21
School of Graduate Studies		
(a) Major Subject Biochemistry		51
Candidates for Ph.D.		40
Candidates for M.Sc.		11
(b) For other Departments		
Graduate Students and Special Students		39
(c) Postdoctoral Fellows		9
	TOTAL	1,057

Among the graduate students majoring in Biochemistry, 2 held Fellowships of the Medical Research Council, 10 held studentships of the Medical Research Council, 4 held Province of Ontario Graduate Fellowships and 6 held Fellowships of the University of Toronto. 27 graduate students were granted Teaching Fellowships by the Department.

The following students registered in the Department of Biochemistry, completed work and presented theses for graduate degrees as follows:

Ph.D. degree

GORNALL, D.
 "Origin of the Yolk Lipoproteins of the Domestic Hen (*gallus domesticus*)"

GURR, P.A.
 "Kinetic Studies of Horse-Liver Alcohol Dehydrogenase"

HOLUB, B.
 "Interrelationships in Phospholipid Metabolism"

HUDGIN, R.
 "Studies on Mammalian Glycoprotein Glycosyltransferases"

KAWAI, M.
 "Chemical Reduction of Folate and Dihydrofolate"

LAWFORD, H.
 "The transport of Citrate and Other Tricarboxylic Acids in *Pseudomonas fluorescens*"

MINTA, J.O.
 "Studies on the Fc Fragment of Immunoglobulin G"

OFOSU, F.
 "Structural Studies on Human Haptoglobin"

WASI, S.
 "Studies on Conformational Changes in Pancreatic Serine Proteases"

WU, T.W.
 "IMP Dehydrogenase from *bacillus subtilis*"

YUEN, R.
 "L-fucose Metabolism in Pig Liver"

M.Sc. degree

CHANG, P.L.
 "The Effects of Thrombin and Collagen on Washed Platelets from Rabbit"

EGGERT, M.
 "Amelogenins, Purification and Partial Characterization of Proteins from Developing Bovine Dental Enamel"

GRAHAM, J.E.S.
 "Pepsin Homologues from Tetrahymena and Rhizopus"

STOCKWELL, M.

"Hyperphenylalaninemia: Effect on the Metabolism of Developing Rat Brain"

WONG, E.R.

"Covalent Labelling of the Active Site of Human Bovine, and Horse Carbonic Anhydrases by Different Reagents"

Woo, Y.T.

"Muscle Surface Enzymes ECTO-ATPase, Cyclic 3', 5'-nucleotide Phosphodiesterases and Adenyl Cyclase"

RESEARCH

In Dr. Anwar's laboratory the work on the structure of elastin and the bacterial cell wall biosynthesis has continued. Mr. Gerber isolated some of the peptides from the cross-link region of elastin and established their sequence. Dr. Kemp solubilized elastin by the cross-link cleavage technique and has purified two fragments (M.W. Cn 10,000) to near homogeneity. The work on the biosynthesis of elastin in fibroblasts in tissue culture was initiated in collaboration with Dr. R.K. Murray. Mr. A. Taku demonstrated the activation of UDP-GlcNAc-enolpyruvate reductase by monovalent cations and studied some aspects of this activation. Mr. Takeda has partially purified pyruvate-UDP-GlcNAc-transferase from *B. cereus* for comparative studies. Mr. Zemell has shown that the enzyme transferase from *E. cloacae* separates into at least 4 active bands on acrylamide gel electrophoresis. He is now studying the interrelationship of these bands.

In Dr. Camerman's laboratory studies were carried out on two major projects, the elucidation of the three-dimensional structures of anticonvulsant drugs, and of the thyroid hormones and their analogues. In the former, the determination of the molecular structures of procyclidine and trihexyphenidyl showed that they have stereochemical features similar to other chemically unrelated drugs, and gave support to our theory of a stereochemical basis for the action of these antiepileptics. In the latter project we were the first successful laboratory to crystallize and determine the structure of the thyroid hormones thyroxine and triiodothyronine, and have discovered important stereochemical data pertaining to their biological activity.

In Dr. Connell's laboratory Mrs. M. Percy has completed her analysis of interaction among the subunits of a human immunoglobulin with deletions in the variable regions of both heavy and light chains. Mrs. B. Buchwald has continued her investigation of the sulphydryl groups of human immunoglobulin G. Miss D. Parr has collaborated with Dr. W. Pruzanski in the investigation of an anomalous cold agglutinin. Dr. Connell has continued his work on enzymic fragments of antibody which retain complement-fixing activity.

Dr. Dorrington's laboratory has continued studies on the structure and conformation of immunoglobulins. Dr. B.R. Smith has studied the equilibrium and kinetics of subunit interaction in immunoglobulin G. Mr. J. Ellerson has isolated and characterized a new fragment from immunoglobulin G which carries the complement-fixing site. Miss P. Holland has been using the induced optical activity of bound hapten to study the geometry of the antigen-binding sites of sheep anti-dinitrophenyl antibodies. Other studies include: a correlation between resistance to digestion in immunoglobulin A and integrity of disulphide bonds; and conformational changes accompanying loss of cytophytic activity in immunoglobulin E.

In Dr. J. Manery Fisher's laboratory Mr. G. Madapallimattam has continued to compare the properties of the isolated plasma membrane and sarcoplasmic reticulum of guinea-pig and frog skeletal muscle. Differences were found in (a) the K^+ -dependent p-nitrophenyl phosphatase and acyl-phosphatase activities, and in (b) the temperature dependence of the ATPase activities of the PM and SR of the two species. Mrs. E.E. Dryden has extended the investigation of the kinetics of lactate uptake into muscle to include the effect of inhibitors and insulin and is identifying the products of lactate metabolism under these conditions.

Dr. J. Forstner and Dr. M.J. Kornblatt using a Ca^{2+} -electrode studied Ca^{2+} -

binding to erythrocyte membranes under equilibrium conditions and found (a) that removal of sialic acid reduces Ca^{2+} -binding to low affinity sites and increases the affinity of the remaining binding sites, and (b) that at least two Ca^{2+} binding sites are apparent from Ca^{2+} adsorption isotherm data.

Dr. I.H. Chaudry in collaboration with Mr. L. Pinteric (using the electron microscope) and with Dr. C. Hsai (using electron spin resonance spin label techniques) has examined the characteristics of the reversal by Ca^{2+} changes produced in the erythrocyte membrane by EDTA. With Dr. Hsia evidence was also obtained showing that insulin induced a conformational change in the plasma membrane of muscle which was not induced in sarcoplasmic reticulum fragments.

Mr. Y-T Woo has demonstrated that kinetic studies can be carried out on enzymes situated on the surface of cells. Using this technique, he showed that insulin influences cyclic AMP metabolism in muscle by increasing the phosphodiesterase activity at the surface. The permeability of muscle cells to nucleotides and nucleosides is also under investigation.

Work in Dr. Hofmann's laboratory has been centred almost completely on penicillopepsin during the last year. Research has covered three areas – sequence study, chemical modification studies, and structure determination. Mr. Kurosky has completed the sequencing of peptides obtained from a chymotryptic digest, as well as peptides from the diagonal electrophoresis of a subtilisin digest of maleylated penicillopepsin. In total, 111 peptides were sequenced. From these, 31 fragments ranging in size from 2 to 28 residues could be deduced. These accounted for 304 out of the 309 amino acids in the protein. Mrs. Rao has been continuing work on the thermolytic digest of penicillopepsin. Her sequence work, along with that of Mr. Kurosky, Dr. Harris, Mrs. Hui, and Mr. Graham has established a sequence of 28 residues at the N-terminal of the enzyme and a sequence of 27 residues at the C-terminal. Striking similarities between pepsin, chymosin, and penicillopepsin are evident in these regions, as well as others. Mr. Mains is carrying out a number of chemical modifications of penicillopepsin in an attempt to elucidate some of the important catalytic residues. He has identified an aspartic acid side chain that reacts with the pepsin inhibitor 1,2-epoxy-3-(p-nitroprenoxy) propane, causing complete loss of enzymatic activity. Also found by Mr. Mains are an iodine-sensitive site and a sensitive lysine residue. Mr. Dalziel, Miss Dangelat, Mrs. Hui, and Dr. Nyburg have been continuing their work on the X-ray determination of the three-dimensional structure of crystalline penicillopepsin. Several good isomorphous derivatives have been obtained, and X-ray data collection is now underway for a 2Å resolution map of the protein. Mr. Jones has completed his purification of two acid carboxypeptidases from *Penicillium janthinellum*. He has conducted specificity and mechanistic studies on these and has shown that one of these has an important sulfhydryl group. These enzymes, because of their broad specificity hold great promise as sequencing tools. Mr. Kurosky and Dr. Hofmann have also completed their nitrous acid studies on serine proteases.

During the past year in Dr. Kay's laboratory research has centred on problems of cancer biochemistry, particularly related to studies with the Ehrlich-Létré ascites carcinoma. Special attention has been devoted to studies of the effects of anti-lymphocyte serum on the growth of this tumour. Preparations of anti-lymphocyte serum have been produced in rabbits by the use of mouse and rat lymphocytes and this serum has been used in experiments *in vitro* to study its activity on tumour cell metabolism, especially of protein and nucleic acids. Study has also been made of the cell membrane of this tumour in relation to the possibility that membrane-bound antigens of tumour cells are masked. Attempts have been made, therefore, to unmask these surface antigens and we have been preparing preparations of antibody in rabbits against the altered tumour cells. Work has continued on the study of the acidic non-histone proteins of chromatin and we have detected as many as thirty proteins in the Ehrlich ascites chromatin. Alterations of the membrane, as above, have been followed by observations of changes in turnover of the chromatin protein and RNA in these cells.

The work on nucleotide-peptides of these cells has shown that these compounds are regulatory in nature, and act at the level of the genome of these cells. We are studying the influence of the nucleotide-peptides on the metabolism of the chromatin proteins.

In general in Dr. Lane's laboratory Mrs. T. Kennedy, Mrs. K. Oakden, Mr. A. Azad, Mr. T. Kwong, and Mr. R. Lau have been engaged with experimental studies of the biogenesis of ribonucleates. In particular, the investigations have dealt with the secondary processing of the biopolymers, and they were designed to elucidate the mechanisms whereby both internal and terminal residues become modified following the primary nucleotide-polymerization reaction. Dormant wheat embryos have been used for studying those processes which can be observed to occur, *in vitro*, and differentiating wheat embryos have been used to study the processes occurring *in vivo*.

Interest in Dr. Murray's laboratory is focused primarily upon various aspects of the biochemistry of glycosphingolipids in mammalian tissues. In studies performed in collaboration with Dr. Schachter, Dr. M.J. Kornblatt has isolated a relatively novel galactoglycerolipid from the testes of several mammalian species. This compound may be an important constituent of mammalian spermatozoa. Mr. S. Chatterjee and Mr. G. Yogeewaran are concluding their studies on biochemical aspects of the glycosphingolipids of cultured mammalian cells. An interesting point that has emerged from these studies is that clonal isolates of various cultured mouse cells may show wide variations of ganglioside pattern. Sensitive radiochemical methods for following glycolipid metabolism in these cells have also been developed. Dr. R. Narsimhan is exploring the glycosphingolipid profiles of a variety of cultured human cells. Mr. D. Bailey is conducting his studies on the proteins of the endoplasmic reticulum of rat liver; a minimum of 30 polypeptide chains is present in this membrane.

In Dr. Packham's laboratory further studies of blood platelets have been carried out with the co-operation of Miss M.A. Guccione, Dr. J. Cazenave, Miss A. Radojewski, and the part-time technical assistance of Mrs. C. Fagerstroem. Inhibition by AMP of ADP-induced platelet changes has been examined and the early stages of the release reaction induced by collagen and thrombin have been investigated. The possibility of the involvement of platelet sialic acid and sulfated mucopolysaccharides in aggregation has been studied. A number of agents and conditions that influence the adherence of platelets to collagen are being assessed quantitatively.

During the past year in Dr. Painter's laboratory Mr. Lukowsky was able to show that the loss of *in vivo* biological activity of erythropoietin which occurs on removal of sialic acid may be restored by the destruction of the newly exposed galactose residue. This has helped clear up much of the confusion regarding the properties of this hormone. Mr. Minta completed his studies of the biological properties of the C-terminal region of immunoglobulin G and showed that although it was inactive in most biological systems it was able to participate in cutaneous anaphylaxis. In collaboration with Dr. M. Freedman of the Faculty of Pharmacy we showed that homogeneous antibody preparations could be separated from specifically purified rabbit antihapten antibody preparations by the use of isoelectric focusing in columns. A reciprocal correlation between the charge on the antigen and the charge on the antibody which it elicited was noted as a result of isoelectric focusing studies on specifically purified antibodies directed against a number of charged antigens.

Ultrastructure of the biological and synthetic membranes was investigated in Mr. Pinteric's laboratory, using an electron microscope. Similar methods including various optical procedures, such as transforms, diffraction, etc. were used to reveal the structure of immunoglobulin and its fragments at the electron microscopic level.

In Professor Schachter's laboratory, several problems in the area of glycoprotein metabolism have been pursued. Mr. R. Hudgin has studied the properties of sialyl-, galactosyl-, and N-acetylglucosaminyltransferases in pork liver. He has also discovered the presence of these three enzymes in human and pork serum. Mr. R. Yuen has completed his work on the purification of a newly discovered enzyme in the catabolism of L-fucose in mammalian liver, namely, L-fuconate dehydratase. Miss N. Nwokoro is working on the next enzyme in this pathway of L-fucose degradation, namely, an NAD-

dependent enzyme which converts the product of L-fuconate dehydratase, 2-keto-3-deoxy-L-fuconate, to an as yet unidentified product. Miss P. Letts is completing work on an N-acetylglucosaminyltransferase present in the rough endoplasmic reticulum of rat liver and has begun a new project on the induction of various glycosyltransferases during the process of spermatogenesis in mouse testis. Dr. Schachter is collaborating with Dr. R. Sheinin of the Department of Medical Biophysics on glycoprotein synthesis in normal and transformed cultured cells, and with Mrs. M. Crookston of Toronto General Hospital Blood Bank on the presence of blood group-specific glycosyltransferases in human serum.

In Dr. Scrimgeour's laboratory the properties of the enzyme dihydropteridine reductase from sheep and bovine sources are being studied by Dr. S. Soldin and Miss S. Cheema. Mr. M. Kawai has examined the reduction of folic acid and dihydrofolic acid by a variety of chemical agents, including dithionite, titanium trichloride, and viologen dyes. All of these studies on the oxidation and reduction reactions of these vitamin derivatives aid in the elucidation of biochemical processes requiring the pteridine coenzymes.

Mr. A. Dennis and Miss D. Chippel are examining the enzyme GMP reductase and IMP dehydrogenase. Both of these enzymes are necessary for the interconversion of the primary purine nucleotides inosinic acid and guanylic acid, necessary precursors of both coenzymes and nucleic acids. IMP dehydrogenase has been clearly established as a "control" or "Allosteric" enzyme in bacteria but the EMP reductase – long thought to be a control step – does not appear to have this function.

Professor Thompson, with the assistance of Mr. R. Baker, Mr. J. Parkes, and Mr. G. MacDonald, is continuing studies in the three areas of lipid metabolism: (a) metabolism of phosphoinositides in the central nervous system with particular emphasis on the positional distribution and turnover of the fatty acids in the phosphoinositides and the purification and properties of enzymes hydrolyzing inositol lipids; (b) the composition and synthesis of phospholipids in inner and outer mitochondrial membranes; (c) the primary events in liver metabolism associated with fatty infiltration of liver in the choline-deficient animal.

Professor Tinker has carried out experimental and theoretical studies of the light-scattering behaviour of phospholipid microvesicles. In collaboration with Mr. L. Pinteric, electron micrographic studies of the structures formed in aqueous systems by complex lipids have been continued. In collaboration with Professor Peter Rand, Brock University, an X-ray study of the phase transitions of phosphatidyl inositol in aqueous systems of varying pH, temperature, and ionic strength has been completed, and a study of the structure of the ternary system lysolecithin-cholesterol-water is underway. Mr. D. Purdon, in collaboration with Professor C. Hsia, Department of Pharmacology, has been carrying out further structural studies on the latter system using spin-labelled chemical probes. Miss M. Menagh has succeeded in preparing morphologically intact membranes from pig erythrocytes and has been studying the amounts and properties of a major protein released from these membranes in the presence of EDTA. Mr. K. Siren has been proceeding with the organic synthesis of analogues of the polar groups of phospholipids.

In Professor Williams's laboratory, investigations have continued on the anion transport mechanisms of mitochondria and on structure-function relationships in the cytochrome oxidase complex. Dr. M. Phillips has extended the work on the dicarboxylate and tricarboxylate carriers to mitochondria devoid from plant tissues. Miss J. Orr has been investigating the permeability to anions of mitochondrial "ghosts." Dr. J.A. Kornblatt has been studying the difference between cytochrome oxidase in single phase solutions and the same enzyme incorporated into phospholipid micelles in which latter situation it provides an interesting model for energy conserving reactions of the mitochondrion.

Work in Dr. Wong's laboratory has continued along two primary avenues of interest, the mechanism of the biosynthesis of ribosomes, and kinetic and binding analyses of enzymic mechanisms. (1) Biosynthesis of ribosomes: efforts in this labora-

tory are directed towards an elucidation of the *in vivo* order of assembly of ribosomal proteins into the mature ribosomal subunits. Concomitantly, characterization of the messenger RNA that codes for these proteins, and the location of their synthesis, is being studied, as well as a determination of the neutral mechanisms involved in the biosynthesis of ribosomes. (2) Kinetic and binding analysis of enzymic mechanisms: in continuing collaboration with Dr. C.S. Hanes and Professor L. Endrenyi, the group has been engaged in the development of theoretical methods for analysing the kinetic mechanisms of two-substrate and three-substrate reactions, isotopic reactant exchange, kinetics of transport carriers, the validity of the steady-state method of enzymic mechanism analysis, and the binding and kinetic behaviour of allosteric systems. In the past year these methods have been applied to the study of β -galactoside permease and liver alcohol dehydrogenase. Work on these systems is continuing in conjunction with the analysis of a third experimental system, that of aspartate transcarbamylase.

HONOURS

Dr. T. Hofmann received a Medical Research Council Visiting Scientist Award and is holding it at C.S.I.R.O. Division of Animal Genetics, Epping, N.S.W., Australia.

SCHOLARLY ADDRESSES

R.R. BAKER and W. THOMPSON, "Asymmetric Incorporation of Fatty Acids into Rat Brain Phosphatidic Acid and Phosphoinositides *In Vivo*," 14th Annual Meeting of the Canadian Federation of Biological Societies, Toronto, June 1971.

N. CAMERMAN, "Molecular Structure Similarities in Chemically Different Anti-epileptic Drugs and a Steric Basis for Anticonvulsant Activity," 3rd International Meeting of the International Society for Neurochemistry, Budapest, July 1971 and to 3rd Meeting of the American Society for Neurochemistry, Seattle, March 1972; "Thyroid Hormone Stereochemistry: The Molecular Structure of L-Triiodothyronine," American Crystallographic Association, Albuquerque, April 1972.

C.I. HARRIS, A. KUROSKY, L. RAO, and T. HOFMANN, "Amino Acid Sequences in Penicillopepsin: Evidence for Homology with Porcine Pepsin and Chymosin," Proc. Biochem. Soc., London, Dec. 1971.

T. HOFMANN, "Pepsin and Penicillopepsin - Catalyzed Transpeptidation," Weizmann Institute, Rehovoth, Israel, Dec. 1971; "Penicillopepsin, A Fungal Acid Protease," St. Vincent's School of Medical Research, Melbourne, Australia, March 1972.

A. KUROSKY, C.I. HARRIS, and T. HOFMANN, "Amino Acid Sequences in Penicillopepsin, a Fungal Homologue of Mammalian Pepsins," Proc. Can. Fed. Biol. Soc., Toronto, June 1971.

G. MAINS and T. HOFMANN, "Studies on the Specificity of Penicillopepsin," Proc. Can. Fed. Biol. Soc., Toronto, June 1971.

K.G. SCRIMGEOUR, "Mechanisms of Enzyme Control," Symposium on "Control of Metabolic Pathways," sponsored by the Toronto Biochemical and Biophysical Society, January 1972.

M. TAKAHASHI, "Penicillopepsin-Catalyzed Transpeptidation," Proc. Can. Fed. Biol. Soc., Toronto, June 1971.

M. TAKAHASHI and T. HOFMANN, "Evidence for an Acyl Intermediate in Pepsin-Catalyzed Reactions," Proc. Biochem. Soc., London, Dec. 1971.

D.O. TINKER, "Structural Studies on Phospholipid-Water Systems," to the Department of Biochemistry, University of Alberta, Edmonton, Nov. 1971.

G.R. WILLIAMS, "The Transport of Anions Across Biological Membranes," to the Biochemistry Dept., McGill University, Montreal, Oct. 1971, and to the Biochemistry Dept., University of Ottawa, Ottawa, Dec. 1971; "Anion Transport Across Biological Membranes," to the Biochemistry Dept., University of Arizona, Tucson, Jan. 1972, and to the Scripps Clinic and Research Foundation, La Jolla, California, Jan. 1972; "The Transport of Anions Across Biological Membranes," to the Biochemistry Dept., Queen's University, Kingston, Feb. 1972.

STAFF CHANGES

DR. J.T-F. WONG went on sabbatical in December 1971 to work with Professor J. Mandelstam at the University of Oxford.

DR. T. HOFMANN left in December 1971 to spend his sabbatical working at C.S.I.R.O., Division of Animal Genetics, Epping, Australia.

DR. D.O. TINKER was made an Associate Professor on 1 July 1971.

PUBLICATIONS

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- Beatty, B.G. and Wong, J.T-F. "Recognition of 'Early' and 'Late' Biosynthetic Classes of Ribosomal Proteins of *Escherichia coli*" (*Canadian Journal of Biochemistry*, vol. 49, 1971, pp. 1276-8)
- Bennick, A. and Connell, G.E. "Purification and Partial Characterization of Four Proteins from Human Parotid Saliva" (*Biochemical Journal*, vol. 123, 1971, pp. 455-64)
- Bronskill, P., Kennedy, T.D. and Lane, B.G. "Cell-free Enzymic Esterification of 5-carboxymethyluridine Residues in Bulk Yeast Transfer RNA" (*Biochimica et Biophysica Acta*, vol. 262, 1972, pp. 275-82)
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- Camerman, N. and Camerman, A. "Molecular Structure of Dienestrol, and a Steric Basis for Estrogenic Activity" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 65)
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- Dorrington, K.J., Bennick, H., and Turner, M.W. "Conformational Studies on Subfragments from the Fc Region of Human Immunoglobulin G" (*Biochemical and Biophysical Research Communications*, vol. 47, 1972, pp. 512-16)
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- Dorrington, K.J. and Smith, B.R. "Conformational Changes Accompanying the Dissociation and Association of Immunoglobulin G Subunits" (*Biochimica et Biophysica Acta*, vol. 263, 1972, pp. 70-81)
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- Forstner, J.F. and Manery, J.F. "Calcium Binding by Human Erythrocyte Membranes" (*Biochemical Journal*, vol. 124, 1971, pp. 563-71)
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- "Inhibitors of the Dicarboxylate and Tricarboxylate Transporting Systems of Rat Liver Mitochondria" (*Journal of Membrane Biology*, vol. 7, 1972, pp. 391-401)
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INSTITUTE OF BIO-MEDICAL ELECTRONICS AND ENGINEERING

Under the direction of Professor N.F. Moody

The Institute presents a decade of progress with some pride. From an original staff of two, and a graduate student population of a single person, it now has ten academics, two research associates, a supporting staff of seven and 40 graduates. Because of the interdisciplinary nature of our work, a graduate student invariably receives co-supervision from one or more additional university departments. To facilitate these linkages the Institute has elected some 20 members who belong to a life science, a physical science or a medical department and whose researches interlock with the Institute.

The Institute has gradually become recognized as the leader of the Medical Engineering field in Canada and has gained an international reputation in several areas.

During the past year its area of interest has been extended into mechanical engineering by the cross-appointment of Dr. D.F. James to the Institute. Thus we now train students from the engineering areas of mechanical, civil, electrical, chemical, engineering science and also from physics, pharmacology and medicine. Since the inception of the Institute 52 of its students have been awarded M.A.Sc., M.Eng. or Ph.D. degrees, and all have found satisfactory employment. Indeed we expect that demand will outstrip supply within the next few years, for the important role of the biomedical engineer in hospitals is rapidly becoming recognized.

Student applications for enrolment always exceed our capacity and for several years only outstanding students of scholarship calibre have been admitted.

Although this report has featured the graduate aspects of the Institute's work, it should be mentioned that undergraduate teaching receives equal emphasis and absorbs some 50 per cent of our staff time.

Our expansion into chemical engineering occurred some years ago, but we have never been able to acquire the small extra space needed to incorporate this activity within our own building. There is no doubt that this isolates the chemical students, and they tell me that they do not feel "part of the Institute". In an interdisciplinary group where cross fertilization is vital the isolation is serious; but all our efforts to solve the problem have proved unavailing.

PUBLICATIONS

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Kunov, H. "A View from this Side of the Plug" (*Hospital Administration in Canada*, Mar. 1972, p. 34)

Llewellyn Thomas, E. *et al.* "Effect of Benzodiazepines upon Saccadic Eye Movements in Man" (*Clinical Pharmacology and Therapeutics*, vol. 12, July-Aug. 1971, pp. 563-74)

Norwich, K.H. "Rates of Protein Synthesis by Deconvolution" (*Biochemical Journal*, vol. 126, 1972, pp. 1124-6)

Norwich, K.H. and Hetenyi, G. "Basic Studies on Metabolic Steady State. Incompletely Mixed Systems" (*Bulletin of Mathematical Biophysics*, vol. 33, 1971, pp. 403-12)

CLINICAL BIOCHEMISTRY (formerly Pathological Chemistry)

Under the direction of Professor A.G. Gornall

From an outside view, the most notable event of the year might be the change in name of this department. Although the Greek roots of the name, Pathological Chemistry, chosen in 1911, can be translated "the study of the chemistry of illness," it had become clear in recent years that a much more widely accepted title is Clinical Biochemistry. This describes the discipline in which teaching and research have their primary orientation to human disease and where responsibility is accepted for the large segment of laboratory medicine that includes the applied fields of the professional clinical chemist and medical biochemist.

A significant increase in teaching responsibilities during the year will be described below. Research productivity has continued at a high level. Although much of this is disease-oriented basic research, we see a need for more applied method development research in clinical chemistry and we have been frustrated thus far in our efforts to refurbish our old teaching laboratory for this purpose.

Our Department Council has continued to exert a co-ordinating influence between

the university and hospital-based divisions of our Department, and functions as an advisory and policy-generating body. There is growing approval of the new structure of Faculty Council and its evident potential for improving policy decisions.

Undergraduate Teaching

There has been a further increase in staff involvement in the medical curriculum, and Dr. A.D. Baines has become chairman of the Coordinators' Sub-Committee. Our major course, "The Biochemistry of Human Diseases," available for the first time to fourth-year Arts and Science students, had an enrolment of 45 and was co-ordinated by Dr. J.A. Kellen. A new course, "The Pathology and Biochemistry of Disease," given jointly by the Departments of Pathology and Clinical Biochemistry to fourth-year students in the Faculty of Pharmacy, had 125 students enrolled and the major share of our teaching was provided by Dr. G. Feuer.

Graduate Teaching

The only graduate courses presented during the year were two short courses given by Dr. W. Paul in the Institute of Biomedical Electronics. There has been a restructuring of graduate courses into half-courses so that students may select areas of special interest to them. One of these, "The Biochemistry and Immunology of Cancer," is co-ordinated by Dr. K.M. Anderson, and another, "The Biochemistry of Lipid Disorders," by Dr. N.Z. Stanacev. Nineteen graduate students were registered, 12 for the Ph.D. and 7 for the M.Sc. degree.

Postgraduate Teaching

The Department sponsored a half-day programme in the Refresher Course for Practising Pathologists. Dr. W. Paul was moderator of the 16th Annual Course in Radioisotopes and also of the course "Radionuclides in Clinical Chemistry." Dr. A. Malkin directed the course "Tutorials and Seminars in Analytical and Clinical Biochemistry."

Four students were registered for the Diploma in Clinical Chemistry and one from the previous year completed the requirements during the year. Development of this programme is still hampered by government reluctance to make professional training stipends available for Ph.D. biochemists. Four graduates of this programme have now been certified by the Canadian Society of Clinical Chemists. An additional five students were registered as residents in fellowship programmes of the Royal College of Physicians and Surgeons.

STAFF

Banting Division

Dr. William Paul returned from sabbatical leave in September and quickly resumed his teaching responsibilities and research activities in the university. Dr. N.Z. Stanacev continues as a very effective Graduate Secretary. Dr. K.M. Anderson has merited promotion to the rank of Associate Professor. All members of staff are to be commended for their dedication to the work and objectives of the Department.

Visiting lecturers to the Department during the year, supported by the School of Graduate Studies, have included: Dr. V.G. Allfrey of The Rockefeller University, New York; Dr. M.B. Mathews of the M.R.C. Laboratory of Molecular Biology, Cambridge; and Dr. Thomas Sandor of Hôpital Notre-Dame, Montréal.

It is appropriate that I express appreciation to Mr. C.H. Downs, Mr. M. Timanoff, Miss A.D. Dix, Mrs. J. Wilson, and Miss M. Brenton for their willing assistance during the year.

The Hospital Divisions

The departments of Clinical Biochemistry in the teaching hospitals constitute divisions of our Department and the Heads of these divisions all hold professorial rank in the Department. No major changes have occurred during the year.

RESEARCH

Banting Division

Under the guidance of Professor A.G. Gornall work on the mechanisms of hormone action has continued in collaboration with Dr. C.C. Liew. Mrs. M. Kandel, Research Associate, has continued to study the active site of carbonic anhydrase isoenzymes in collaboration with Dr. S. Kandel of the Faculty of Pharmacy. Amino acid sequence studies have revealed similarities and differences in the location of reactive histidine residues in the primary structure of carbonic anhydrases which might be related to the previously observed differences in their catalytic activity. High-resolution NMR studies were used to determine the pK's of the active site histidines and have shown that they are likely not identical with the group in the enzyme which controls the catalysis. Dr. P.R. Desjardins, Research Associate, has investigated the enzymes involved in the phosphorylation of nuclear and cytoplasmic proteins. With the assistance of Miss C. Yuen rat heart cytoplasmic protein kinase, as well as two nuclear protein kinases, have been partially purified and studied in relation to substrate specificity and stimulation by cyclic AMP. In a collaborative effort with Dr. K.M. Anderson the protein kinase activity in rat mammary gland nuclei has been investigated.

Professor W. Paul has resumed work on the problem of oximetry. A more sensitive earpiece for measuring oxygen saturation changes has been assembled and problems with the electronics are being investigated. A gamma camera using light image amplification is a development problem, undertaken in collaboration with the Institute of Biomedical Electronics. Experiments to determine the physical parameters of the crystal detectors have been completed. Fabrication of a nine-inch diameter matrix, based on a calculated optimum configuration, is proceeding. The problem of cutting and sealing caesium iodide crystals has been solved and a detector sufficiently large for thyroid measurement has now been attached to the instrument for experimental assessment.

Professor N.Z. Stanacev, with J.B. Davidson (Ph.D. candidate) and assisted by Mrs. L. Stuhne-Sekalec and Miss Z. Domazet, has continued studies on the biosynthesis and metabolism of complex lipids of biological membranes. The mechanism of the cardiolipin biosynthesis in mitochondria has been studied and elucidated. It was found that this mechanism involves CDP-diglyceride and phosphatidylglycerol in the cardiolipin formation in isolated mitochondria. In addition, enzymatic spin-labelling of phospholipids was studied and the biosynthesis of spin-labelled phosphatidic acid was reported.

Professor G. Feuer, with his graduate students, D. Acheampong-Mensah (Ph.D. candidate), S.D. Cooper (Ph.D. candidate), R. Kardish (Ph.D. candidate), and Miss D. Miller (M.Sc. candidate), and assisted by Mrs. H. Belina and Mrs. R. Farkas, has continued investigations of the effects of foreign compounds on the biochemical organization of the liver cell. These studies have revealed that regulation of microsomal phospholipid synthesis may be an important step in the action of foreign compounds on the hepatic endoplasmic reticulum. Particularly, the synthesis of lecithin appears to be associated with the induction of drug-metabolizing enzymes. Studies on the ontogenesis of microsomal enzymes have shown that the low enzyme activity in the liver of the foetus and newborn is probably connected with inhibitors originating in the maternal organism.

Professor A.D. Baines and his research group, by considering the kidney as a complex of passive pipes – some rigid, others collapsible or distensible – are able to explain in part the increased glomerular filtration rates through short superficial nephrons that occur with chronic salt or water loading. The extent of redistribution is determined by the relative lengths of superficial and deep nephrons. Water, sodium, urea, plasma, protein, and red blood cells also are redistributed by chronic salt or water loading. These alterations affect the relative roles of cortex and medulla in solute and water reabsorption. Urine composition and volume is thereby modified. Micro-perfusion experiments by Y.G. Koh (M.Sc. candidate) have shown that Henle's loop

behaves as a distensible-collapsible tube in which flow resistance is influenced by downstream pressure. An increase in downstream pressure reduces resistance to flow. K.E.Y. Tabet (Ph.D. candidate) has suggestive evidence that urea loading inhibits salt and water reabsorption in the proximal tubule but not in the distal nephron. He has also shown that increases in plasma urea concentration are responsible for the reduced capacity to generate free water associated with a reduction in the number of functioning nephrons.

Professor J.A. Kellen has studied the antigenicity observed in dimethylbenzanthracene-induced rat mammary tumours by immunoelectrophoresis and antibodies labelled with ^{131}I . The tumours induced and the ovaries in tumour-bearing rats show high binding of the labelled antiserum administered intravenously *in vivo*; autoradiography of these tumours and normal tissues has been initiated. The temporal sequence of tumour-protein production after chemical carcinogenesis can be "mapped"; binding to mammary glands occurs before the development of palpable nodules can be observed. With V. Lustig (Ph.D. candidate), the presence of fructose diphosphatase in DMBA-induced tumours was demonstrated and enzyme activities correlated with the degree of malignancy and the secretory status of the nodules, as defined histologically. With Mr. J. Lo (Ph.D. candidate), a transplantable (Zimmerman) glioma in C57BL Jackson mice is being studied and compared to human brain tumours by immunofluorescent methods.

Professor K.M. Anderson has continued studies concerning the effect of androgens on nuclear protein and RNA synthesis with the aid of Mrs. M. Slavik and Mrs. A.K. Evans. Mr. R.M. Couch (M.Sc. candidate) has examined the structure and function of prostate "chromatin." Mr. I.S. Mendelson (Ph.D. candidate) is studying the effect of various hormonal derangements on the behaviour of rat mammary gland RNA polymerases. In collaboration with Dr. J.A. Kellen, studies utilizing the DMBA-induced rat mammary tumour model have continued.

Professor C.C. Liew has directed a group collaborating as a main interest on the covalent modification of chromosomal and ribosomal proteins in relation to hormone action at the molecular level. Dr. P.R. Desjardins has isolated and purified nuclear protein kinases and studied the effects of aldosterone on nuclear protein kinase activity. Dr. P.F. Lue, a postdoctoral fellow, has purified and characterized the nuclear acetyltransferase enzyme(s). Suria Ng (Ph.D. candidate) has fractionated nuclear acidic proteins and studied their biochemical significance in relation to gene expression. Studies on acetylation and phosphorylation of ribosomal proteins have been carried out with the assistance of Mrs. K.L. Yao, and studies of histone acetylation during cardiac hypertrophy with the assistance of J.G. Carruthers.

In all these studies the support of the Medical Research Council, Ontario Cancer Treatment and Research Foundation, Ontario Heart Foundation, Addiction Research Foundation, and Defence Research Board is gratefully acknowledged.

Professor B. Cinader has continued his studies on acquired immunological tolerance and on tolerance breakdown. In collaboration with Dr. J.E.M. St. Rose, the genetics of tolerance breakdown has been explored and a strain of rabbits, resistant to tolerance breakdown, has been obtained by selective breeding. In collaboration with Dr. A.M. Kaplan, unresponsiveness of T and B cells of tolerant animals was demonstrated by reconstitution of irradiated donors with bone marrow cell fractions and with thymus cells from tolerant and normal donors. Dr. Cinader has extended his studies on receptor properties, using affinity and allotypic specificity as markers. In collaboration with Drs. C.-T. Chou and S. Dubiski, the relative quantities of plaque-forming antibody with different allelic allotypes of the light chain were studied. It was shown that there is a difference in the number of receptors with different allelic allotypic specificities. In collaboration with Dr. C.-Y. Wu, the maturation of avidity of IgM was examined; time- as well as dose-dependent changes in the avidity of IgM was demonstrated. The effect of graft-*vs.*-host reaction on allotypic suppression was explored and escape from suppression as a consequence of graft-*vs.*-host reaction was discovered. The magnitude of this effect is related to the magnitude of graft-*vs.*-host

reactivity as measured by Simonsen's spleen enlargement test. Dr. J.E.M. St. Rose and B.H. Sabiston (Ph.D. candidate) have been studying the effect of low environmental temperature on immunological reactivity and have identified several alterations at the humoral level.

Professor S.L. Cohen, with Mrs. F. Altspector (M.Sc. candidate), has devised assays for "labile" estrogens of both pregnancy and non-pregnancy urine. For the former, the specific estrogens are identified by gas chromatography. For the latter, radioactive estrogen conjugates are used to check the amount of estrogen precipitate obtained with the ammonium sulfate procedure.

Dr. J.S. Olin has continued his analysis of medical features and biochemical parameters in over one thousand alcoholics.

The Hospital Divisions

At Toronto General Hospital, Dr. C.J. Porter is involved in several studies in collaboration with members of the clinical staff. These include biochemical screening of maternal blood and amniotic fluid, malignant hyperthermia, new drug assessment, method development studies associated with hyperalimentation research and studies in liver disease. Dr. A. Mazzuchin has improved the method for amniotic fluid bilirubin, automated procedures for amylase, cholesterol and triglyceride, and validated several other methods. Dr. V.M. Jones has developed improved techniques for dilantin, bile acids, lecithin, sphingomyelin, medium chain fatty acids and serum lactate, and collaborated in studies of indocyanine green as a liver function test.

At Sunnybrook Hospital, Dr. A. Malkin has continued studies of uric acid metabolism and Dr. B.J. Cadeau has extended her studies of alkaline phosphatase isoenzymes.

At Toronto Western Hospital (Spadina division), Professor S. Dubiski, in association with R. Shek (Ph.D. candidate) has continued his research on the genetics of antibody response and genetics of the immune system. In particular, the phenotypic expression of immunoglobulin genes has been studied and the role of these genes in the initiation of antibody response. With Dr. Bash, postdoctoral fellow, he has found a genetically controlled alloantigen specific to lymphoid tissue of the rabbit, and studies on this antigen are being continued. Dr. R.R. Ogilvie has introduced a method for estimating small concentrations of urine protein as a diagnostic test in kidney disease. Dr. H. Husdan has been involved in several collaborative studies. With Dr. A. Rapoport (Dept. of Medicine), he has evaluated data on the effect of posture on serum calcium and protein. As a preliminary to a study of thiazides in patients with hypercalcuria, a method of isolating red blood cells and measuring their potassium content has been developed. With Dr. D. Oreopoulos (Dept. of Medicine), he has examined the effect of a purine-free and meatless diet on the excretion of a number of urinary constituents.

At St. Michael's Hospital, Mr. M. O'Sullivan and Mrs. G. Buckley have continued hyperlipemia studies in collaboration with Dr. A. Little (Dept. of Medicine).

At the Hospital for Sick Children, Dr. S.H. Jackson, with Mr. J. Heininger (Ph.D. candidate), has studied the reutilization of mature collagen in granuloma formation. Collaborative studies on inherited disorders of amino acid metabolism are continuing. Dr. J.G. Hill and Dr. G. Cherian have completed an assessment of a skin electrode system for measuring sweat chloride and commenced a study of age and sex in relation to normal values for alkaline phosphatase, oxaloacetic transaminase, and creatine kinase.

At the New Mt. Sinai Hospital, Dr. A. Pollard has continued work on the automation of radioimmunoassays, and conducted evaluation studies of the Beckman uric acid analyser and the Ames "Tetralute" method for serum thyroxine.

At the Wellesley Hospital, Dr. L.A. Wright has extended his interest in methods for the analysis of abused drugs.

At the Women's College Hospital, Dr. F.H. Sims has collaborated with Dr. G. Hiraki (Dept. of Surgery) on the relationship of pancreatic function to atherogenesis, and with Dr. J. Taylor and Mrs. E. Giesbrecht (Dept. of Obstetrics and Gynaecology)

has assessed urinary estriols as an aid in diagnosis. A study has been made, with Miss E. Sekulova, of bilirubin excretion in the faeces of newborn infants when agar is added to the diet.

At the Clarke Institute of Psychiatry, Dr. D.D. Godse has studied brain serotonin, norepinephrine, and 5-hydroxyindole acetic acid in rats pretreated with centrally active drugs.

HONOURS

DR. L.A. WRIGHT has been this year's President of the Canadian Society of Clinical Chemists.

DR. B. CINADER was appointed Director of the Institute of Immunology at the University of Toronto; the Pfizer Fellowship was awarded to Dr. Cinader at Institut de Recherches Cliniques, Montréal.

In 1972 the Stuart Alan Hoffman Memorial Prize for excellence in research was won by MR. VILIAM LUSTIG.

DR. S. DUBISKI has been elected Vice-President of the Canadian Society for Immunology.

DR. A. POLLARD was elected President of the Ontario Society of Clinical Chemists for 1972-3.

SCHOLARLY ADDRESSES

Academy of Medicine, Toronto, Meeting of Section of Obstetrics and Gynaecology, Nov. 1971: S.L. COHEN, "Estrogen Excretion by Diabetic Pregnant Patients."

American Association of Clinical Chemists, 23rd National Meeting, combined with Canadian Society of Clinical Chemists, 15th Annual Meeting, Seattle, Wash., Aug. 1971: J.G. HILL (co-author with A. GEORGE CHERIAN) "Experience with Use of a Chloride Sensitive Skin Electrode in Detection of Cystic Fibrosis"; H. HUDSAN and A. RAPOPORT, "Estimation of Plasma Ionic Calcium with the Orion Calcium Flow-through System"; S.H. JACKSON, "Problems of Screening for Metabolic Diseases in Infants."

Biophysical Society International, Toronto, 16th Annual Meeting, Feb. 1972: K.M. ANDERSON, (Mrs.) A.K. EVANS, (Mrs.) M. SLAVIK, and (Mr.) R.M. COUCH, "Further Properties of Amino Acid Incorporation into Proteins Catalyzed by Isolated Prostate Nuclei."

Canadian Association for Research in Toxicology, Montreal, Fifth Annual Symposium, Dec. 1971: G. FEUER, "The Link between the Mother and Fetus in Drug Metabolism"; G. FEUER (co-author) *et al.*, "Nutritional Influences on Drug Metabolism."

Canadian Federation of Biological Societies 15th Annual Meeting, Quebec City, June 1972: R.M. COUCH (Mr.) and K.M. ANDERSON, "Androgen-stimulated Labeling of Acidic Chromosomal Proteins by Isolated Rat Ventral Prostate Nuclei"; J.B. DAVIDSON (Mr.) and N.Z. STANACEV, "Biosynthesis of Phosphatidic Acid. Reinvestigation of Mitochondrial and Microsomal Acylation of sn-Glycerol-3-phosphate"; P.R. DESJARDINS, P.F. LUE, C.C. LIEW, and A.G. GORNALL, "Partial Characterization of Two Protein Kinases Isolated from Rat Liver Nuclei"; G. FEUER (co-author with J.C. SOSA-LUCERO *et al.*), "Drug-diet Interaction on Hepatic Drug Metabolizing Enzymes"; G. FEUER and H. BELINA (Mrs.) (with F.A. DE LA IGLESIA *et al.*), "Ultrastructural and Biochemical Hepatic Changes induced by Diethylaminoethylhexestrol (DAH)"; M. KANDEL (Mrs.), A.G. GORNALL, D.L. CYBULSKY, and S.I. KANDEL, "Location of Two Histidine Residues in the Primary Structure of Carbonic Anhydrases"; R. KARDISH (Mr.) and G. FEUER (with J.C. SOSA-LUCERO *et al.*), "Effect of Amphetamine on the Pregnant Rat"; J.A. KELLEN, "Antithyroidal Substances and Induction of Rat Mammary Tumours with DMBA"; P.F. LUE, A.G. GORNALL, and C.C. LIEW, "Identification of Two Forms of Acetyltransferase in Rat Liver Nuclei

Extracts"; V. LUSTIG (Mr.) and J.A. KELLEN, "Fructose-1,6-Diphosphatase in DMBA-induced Rat Mammary Tumours"; I.S. MENDELSON (Mr.), P.R. DESJARDINS and K.M. ANDERSON, "Protein Kinase Activity in Rat Mammary Gland Nuclei"; D.R. MILLER (Miss) and G. FEUER, "Association between Drug Metabolism and Drugs possessing Methyl Groups"; J.E.M. ST. ROSE *et al.*, "Influence of Environmental Temperature on Anaphylaxis"; D. SURIA (Mr.) and C.C. LIEW, "Acetylation and Phosphorylation of Nuclear Acidic Proteins in Regenerating Liver."

Canadian Hepatic Foundation, Toronto, Research Workshop, Jan. 1972: G. FEUER, "Influence of Foreign Compounds on the Organization of Microsomal Phospholipids."

Canadian Society for Clinical Investigation Annual Meeting, Toronto, Jan. 1972: A.D. BAINES, "Mechanism for Redistributing Nephron Function."

Canadian Society for the Study of Fertility, 19th Annual Scientific Meeting, London, Canada, June 1972: K.M. ANDERSON, "Mechanism of Action of Steroid Hormones."

College of Family Practice, Orthopaedic Hospital, Toronto, Feb. 1972: J.S. OLIN prepared papers on medical factors for pain of foot, shoulder, and back.

Federation of American Societies for Experimental Biology 56th Annual Meeting, Atlantic City, April 1972: Y.G. KOH (Mr.), A.D. BAINES, and D.F. JAMES, "Some Flow Characteristics in Rat Renal Tubules"; D.K. LIU, C.C. LIEW, and A.G. GORNALL, "Aldosterone Effects on Nuclear and Mitochondrial RNA Synthesis in Heart and Kidney."

First International Congress of Immunology, Washington, D.C., Aug. 1971, Workshop on Tumour Antigens: B. CINADER, "Recent Advances in the Study and Application of Antibody-enzyme Interaction"; J.A. KELLEN, "Antigenicity of DMBA-induced Rat Mammary Tumors."

Fourth International Congress of Endocrinology, Washington, D.C., June 1972: C.C. LIEW, (Mr.) D. SURIA, and A.G. GORNALL, "Aldosterone Effects on Acetylation and Phosphorylation of Nuclear and Ribosomal Proteins."

Institut de Recherches Cliniques de Montréal, May 1972: B. CINADER, "Role of the Receptor in the Immune Response" and "The Future of Tumour Immunology."

International Congress of Clinical Chemistry, Copenhagen, June 1972, and at the Technicon Congress, New York, June 1972: A. POLLARD and J.J. CLAPP *et al.*, "Beckman Uric Acid Analyser. A Comparison with a Colorimetric and an Ultraviolet Enzyme Technique."

Ontario Cancer Treatment and Research Foundation, Third Clinical Cancer Conference, Geneva Park, Ontario, Sept. 1971: K.M. ANDERSON and J.A. KELLEN, "DMBA-induced Rat Mammary Tumours as a Model for Human Breast Cancer"; B. CINADER, "Whither Immunology?"

Ontario Society of Clinical Chemists, Toronto, Nov. 1971: J.A. KELLEN, "Serum Alkaline Phosphatase and the Separation of its Isoenzyme Components."

Panamerican Association of Biochemical Societies, First Meeting, Caracas, July 1971: G. FEUER, (Mr.) S.D. COOPER *et al.*, "Correlations between Drug Metabolism and Phospholipids in the Endoplasmic Reticulum"; G. FEUER (with F.A. DE LA IGLESIA *et al.*), "Developmental Changes in the Endoplasmic Reticulum of the Liver Cell."

At Philadelphia General Hospital, January 1972, J.S. OLIN contributed to seminar presentation of "Alcoholic Toxicity."

Technicon Congress, New York, June 1972: A. POLLARD *et al.*, "Automatic Radioimmunoassay II."

Toronto Neurological Society, at Academy of Medicine, Nov. 1971: J.A. KELLEN, "Immunological Approach to the Study of Brain Tumours."

Toronto Section Meeting, Clinical Biochemists, Oct. 1971: A. MAZZUCHIN, "Triglyceride Methodology"; March 1972 Meeting, V.M. JONES, "Measurement of Fecal Fat."

Toronto Western Hospital, Seminar Group Meeting, Obstetrics and Gynaecology, Nov. 1971: S.L. COHEN, "Estrogen Excretion by Diabetic Pregnant Patients."

University of Connecticut, Hartford, U.S.A., March 1972: B. CINADER was Visiting Lecturer on "The Possibilities of Tumour Immunology in the Medicine of Tomorrow" and "Receptors on Precursors to Antibody-forming Cells."

University of Michigan, Dept. of Obstetrics and Gynecology, May 1972: S.L. COHEN, "Recent Findings on the Excretion of Estrogens during Pregnancy."

University of Western Ontario, London, April 1972: B. CINADER on "Aspects of the Receptor Concept in the Humoral Immune Response" and "General Problems of Tumour Immunology."

Warner-Chilcott Symposium on Quality Control, Toronto, March 1972: C.J. PORTER, "Quality Control at the Patient Level."

PUBLICATIONS

- Anderson, K.M. and Kellen, J.A. "Inhibition of Rat Mammary Gland DNA-labelling by Actinomycin D and DMBA is neither Additive nor Synergistic" (*Research Communications in Chemical Pathology and Pharmacology*, vol. 3, Mar. 1972, pp. 393-401)
- Anderson, K.M., Slavik, M., and Elebute, O.P. "Labelling of Proteins by Isolated Rat Liver Nuclei" (*Canadian Journal of Biochemistry*, vol. 50, Feb. 1972, pp. 190-9)
- Anderson, K.M. (with Liao, S., Tymoczko, L., Liang, T., and Fang, S.). "Androgen Receptors: 17 β -hydroxy-5 α -androstane-3-one and the Translocation of a Cytoplasmic Protein to Cell Nuclei in Prostate"; in *Advances in the Biosciences*, vol. 7, ed. G. Raspe, pp. 155-63. Oxford: Pergamon Press 1971
- Baines, A.D. "Effect of Extracellular Fluid Volume Expansion of Maximum Glucose Reabsorption Rate and Glomerular Tubular Balance in Single Rat Nephrons" (*Journal of Clinical Investigation*, vol. 50, Nov. 1971, pp. 2414-25)
- Cinader, B. "The Future of Tumour Immunology" (*Medical Clinics of North America*, vol. 56, May 1972, pp. 801-36)
- Introduction to "The Biology of Complement Components"; in *Proceedings of International Symposium of Biological Activities of Complement*, Guelph, Ont., pp. 240-3. Basel: S. Karger 1971
- Cinader, B. (with Anderson, S.G. *et al.*) "Measurements of Concentrations of Human Serum Immunoglobulins" (*Journal of Immunology*, vol. 107, Dec. 1971, pp. 1798-9)
- Cohen, S.L. "The Excretion of 'Labile' Estrogens during Human Pregnancy. I. Normal Pregnancy; II. Diabetic Pregnancy" (*Acta Endocrinologica*, vol. 67, Aug. 1971, pp. 677-86; 687-97)
- Cooper, S.D. and Feuer, G. "Relation between Drug-metabolizing Activity and Phospholipids in Hepatic Microsomes, I. Effects of Phenobarbital, Carbon Tetrachloride and Actinomycin D" (*Canadian Journal of Physiology and Pharmacology*, vol. 50, June 1972, pp. 568-75)
- Davidson, J.B. and Stanacev, N.Z. "Biosynthesis of Cardiolipin in Mitochondria" (*Canadian Journal of Biochemistry*, vol. 49, Oct. 1971, pp. 1117-24)
- Dubiski, S. "Genetics and Regulation of Immunoglobulin Allotypes" (*Medical Clinics of North America*, vol. 56, Mar. 1972, pp. 557-75)
- Dubiski, S., Chou, C.-T., and Cinader, B. "Allotypic Specificity as a Marker of Cells and Cell Receptors: Antigen Recognition and Antibody Production" in *Proceedings of the 2nd International Convocation of Immunology*, Buffalo, pp. 140-52, New York: S. Karger 1971
- Feuer, G. Reviews, *Therapeutics*, vol. 1, July 1971, p. 19; *Modern Medicine*, vol. 26, Oct. 1971, p. 16; vol. 27, Apr. 1972, p. 327
- Feuer, G., Cooper, S.D. *et al.* "Microsomal Phospholipids and Drug Action - Quantitative Biochemical and Electron Microscopic Studies" (*Journal of Clinical Pharmacology*, vol. 5, Mar. 1972, pp. 389-96)
- Feuer, G., De La Iglesia, F.A. *et al.* "Quantitative Structural and Functional Changes in the Hepatic Endoplasmic Reticulum due to Reduced Food Intake" (*Proceedings of the Royal Microscopical Society*, vol. 6, 1971, pp. 13-14)
- Feuer, G., Sosa-Lucero, J.C. *et al.* "Failure of Various Drugs to Induce Drug-metabolizing Enzymes in Extrahepatic Tissues of the Rat" (*Toxicological Applications of Pharmacology*, vol. 19, Aug. 1971, pp. 579-89)
- Feuer, G. and Wald, R. "Molecular Orbital Calculations on Coumarins and the Induction of Drug-metabolizing Enzymes" (*Journal of Medicinal Chemistry*, vol. 14, Oct. 1971, pp. 1081-4)
- Hill, J.G. and Thompson, Margaret W. (with Qazi, Q.H.) "Steroid Studies in Parents of Patients with Congenital Virilizing Adrenal Hyperplasia" (*Journal of Clinical Endocrinology and Metabolism*, vol. 33, July 1971, pp. 23-6)
- Kandel, M., Gornall, A.G., Kandel, S.I., Freedman, M.H., Cohen, J.S., and Yim, C.T. "Studies of the Histidine Residues of Carbonic Anhydrases using High-field Proton Magnetic Resonance" (*Biochemistry*, vol. 11, Feb. 1, 1972, pp. 327-34)
- Kandel, S.I., Kandel, M., Gornall, A.G., and Wong, S.C.C. "Covalent Labeling of the Active

- Site of Human Carbonic Anhydrase B with N-bromoacetylacetazolamide" (*Journal of Biological Chemistry*, vol. 247, June 25, 1972, pp. 3810-21)
- Kardish, R. and Feuer, G. "Relationship between Maternal Progesterones and the Delayed Drug Metabolism in the Neonate" (*Biology of the Neonate*, vol. 20, Jan.-Feb. 1972, pp. 58-67)
- Kellen, J.A. "Effect of Hypothyroidism on the Induction of Mammary Tumors in Rats with 7,12-dimethylbenz(α)anthracene" (*Journal of the National Cancer Institute*, vol. 48, June 1972, pp. 1901-4)
- Reviews, *Therapeutics*, vol. 1, July 1971, p. 21; *Modern Medicine*, vol. 27, June 1972, p. 74
- Kellen, J.A. and Anderson, K.M. "Hypertension in Sprague-Dawley Rats after Single or Multiple Challenge with DMBA" (*Research Communications in Chemical Pathology and Pharmacology*, vol. 3, Jan. 1972, pp. 123-8)
- Kellen, J.A. and De La Torr  "Antigenicity of 7,12-dimethylbenz(α)anthracene-induced Rat Mammary Tumours in Cell Culture" (*Revue d'Immunologie*, vol. 35, Oct.-Dec. 1971, pp. 259-63)
- Kellen, J.A., Lo, A. C.H. and Kolos, T.O. "Immunoelectrophoretic Analysis of DMBA-induced Rat Mammary Tumours" (*Oncology*, vol. 25, No. 5, 1971, pp. 401-9)
- Kerr, M.K., Hitchman, J.A., Husdan, H., Rapoport, A., and Harrison, J.E. "The Value of Carrier-free ^{51}Cr as a Stool Marker" (*Clinical Biochemistry*, vol. 4, Dec. 1971, pp. 233-40)
- Liew, C.C., Liu, D.K., and Gornall, A.G. "Effects of Aldosterone on RNA Polymerase in Rat Heart and Kidney Nuclei" (*Endocrinology*, vol. 90, Feb. 1972, pp. 488-95)
- Lo, J.S. and Kellen, J.A. "Spontaneous Partial Reactivation of Chelated Placental Alkaline Phosphatase" (*Enzyme*, vol. 12, 1971, pp. 606-17)
- Lustig, V. and Kellen, J.A. "Effects of L-Homoarginine on Rat Tissue Alkaline Phosphatases *in vivo*" (*Enzymologia*, vol. 41, Dec. 1971, pp. 336-44)
- Mendelson, I.S. and Anderson, K.M. "Mammary Gland Nuclear RNA Polymerase Activities in Pregnant, Lactating and 7,12-dimethylbenz(α)anthracene-induced Mammary Tumor-bearing Rats" (*Can. Journal of Biochemistry*, vol. 50, June 1972, pp. 644-53)
- Olin, J.S. "How a Sample of Toronto Physicians see Alcoholism and Drug Addiction" (*Canadian Family Physician*, vol. 17, Oct. 1971, pp. 80-6)
- Stanacev, N.Z., Prostenik, M. *et al.* "Synthesis and Resolution into Optical Antipodes of C₂₀-phytosphingosine" (*Chemistry and Physics of Lipids*, vol. 7, Nov. 1971, pp. 135-43)
- Stanacev, N.Z., Stuhne-Sekalec, L., Schreier-Muccillo, S., and Smith, I.C.P. "Biosynthesis of Spin-labelled Stearic Acid into Phosphatidic Acid" (*Biochemical and Biophysical Research Communications*, vol. 46, Jan. 14, 1972, pp. 114-19)
- Stanacev, N.Z., Davidson, J.B., Stuhne-Sekalec, L., and Domazet, Z. "The Mechanism of the Biosynthesis of Cardiolipin in Mitochondria" (*Biochemical and Biophysical Research Communications*, vol. 47, June 9, 1972, pp. 1021-7)
- St. Rose, J.E.M. and Sabiston, B.H. "Effect of Cold Exposure on the Immunologic Response of Rabbits to Human Serum Albumin" (*Journal of Immunology*, vol. 107, Aug. 1971, pp. 339-43)
- Wu, C.-Y. and Cinader, B. "A Population Study of Cells forming Antibodies to a Chemically defined Determinant" (*Journal of Immunological Methods*, vol. 1, 1971, pp. 19-41)
- Wu, C.-Y. and Cinader, B. "Antigenic Promotion. Increase in Hapten Specific Plaque-forming Cells after Preinjection with Structurally Unrelated Macromolecules" (*Journal of Experimental Medicine*, vol. 134, Sept. 1, 1971, pp. 693-712)

FAMILY AND COMMUNITY MEDICINE

Under the direction of Professor F.B. Fallis

The Academic Year 1971-2 has seen considerable progress in undergraduate curriculum development, graduation from the two-year residency programme by the first major wave of trainees, consolidation of professional staff and clinical facilities in new Family Practice Units, co-ordination of clinical activities among the thirty Teaching Practices, and further co-operation with other clinical departments and health science faculties. The two departmental meetings convened under the new Faculty Council constitution were confined to curriculum, one on general aspects and one on Period III.

The Departmental Period III Committee, working with the Faculty Period III Committee and the Division of Studies in Medical Education, has established the family and community medicine content of the new Ambulatory Care experience, and have produced a related "students' handbook." The Family Practice Residency Pro-

gramme had 25 residents in the first year and 28 residents in the second year of a two-year programme. Eighteen of the second-year residents sat the certification examination set by the College of Family Physicians of Canada in June 1972. Detailed consideration continues to be given to the relationship of curriculum to established community needs and to the problems and opportunities inherent in using community based facilities for University teaching.

RESEARCH

DR. STANLEY BAIN (Toronto General) has completed his research on the use of the Emergency Department at the North York General Hospital.

DR. YVONNE DEBUDA (Women's College) has received grant support and has begun her study of Family Physician Manpower in Metropolitan Toronto.

DR. JOHN HILDITCH (Sunnybrook) has almost completed a study of "A Doctor-Nurse Shared Care for Chronically Ill Patients." He has also applied for grant support of "The Flemington Park Health Survey."

DRS. PERKIN, MONKMAN, ANGUS, and HOPKINS (Toronto Western) have assisted the Faculty of Nursing to complete their research on "The Role of the Community Health Nurse."

DR. RODGER HINES (Toronto General) has completed one year of study of the demonstration teaching model practice "The St. George Health Centre."

DR. H.F. KING (Toronto General) has co-ordinated the department's teaching practices and has applied for grant support for the demonstration model practice "The Midland Health Resources Centre."

DR. DAVID LAWEE (Toronto General) presented "Clinical Clerk's Attitude Towards Computerized Health Examinations," Toronto Society for Clinical Research, March 1972.

DR. LORNE LAING (Wellesley) is studying the use of pap smears in the diagnosis of vaginitis in adolescent females.

SCHOLARLY ADDRESSES

L.M. CATHCART, "Cancer Screening Examinations Pros and Cons," Canadian Cancer Society.

E. DUNN, "My Approach to the Young Patient Taking Drugs," Annual Meeting of Family Medicine, Society of Teachers of Family Medicine, Banff, October 1972.

F.B. FALLIS, "Identification and Training of Family Medicine Teachers," National Workshop on Certification, College of Family Physicians of Canada.

P.D. HOPKINS, "Vaginitis," "Post Patient Depression," Postgraduate Course, University of Toronto.

R.M. HINES, "Community Hospital - Nursing Home Co-operation in Providing an Extended Care Unit by Contract," Association of Nursing Homes of Ontario.

L. LAING, "Clinical Aspects of Gonorrhea," Medical Offices of Health; "Gonorrhea Diagnosis and Treatment," Wellesley Clinical Day.

R.L. PERKIN, "Use and abuse of Tranquillizers," Postgraduate Course, University of Toronto.

BETTE STEPHENSON, "Role of Women in Medicine," Federation of Medical Women of Canada; "Role of Family Practice in the Future of Health Care," University Womens Clubs, Toronto and London; "Ethics for the Health Profession," U of T Faculty of Nursing; "Professional Isolation," U of T Faculty of Law.

STAFF CHANGES

Resignations

Dr. L. Levine (to practice in India), Dr. Parliament, Dr. Segal (to return to the U.S.A.), Dr. Vavrik.

Leaves of Absence

Dr. Joan Dixon (one year in Europe), Dr. Murray Herst (one year in Israel).

Promotions

Dr. R. Fisher from Associate to Assistant Professor; Dr. Stephen Kandel from Clinical Teacher to Associate; Dr. Chris Wells from Clinical Teacher to Assistant Professor.

New Appointments

Dr. I. Bean, Assistant Professor and Head of the Department of Family and Community Medicine, Wellesley Hospital; Dr. Y. deBuda, Head of the Department at the Women's College Hospital; Dr. J. Leitch, Assistant Professor; Dr. D. Steele, Assistant Professor and Director of Flemingdon Health Centre; Dr. G. Microys, Associate.

Clinical Teachers: Drs. J. Cowell, D. Handley, J. Losos, P. Freedman, L. Librach, I. Garther, A. Shellam, H. Haberfellner, J. Mountifield, M. Seidl, N. Shneidman, B. Stephenson, Teshera.

PUBLICATIONS

deBuda, Y. "How the Austrians Provide 24 hour Emergency Services" (*Canadian Family Physician*, Dec. 1971, pp. 55-8)

Bain, S. "Use and Abuse of Hospital Emergency Departments" (*Canadian Family Physician*, May 1971, pp. 33-6)

Fallis, F.B. and Rice D.I. *Community Health Centres*. Submission of the College of Family Physicians of Canada to the Hastings Commission

Monkman, E. and Finnigan A.P.J. "Attitudes to Health Care" (*Canadian Family Physician*, Jan. 1972, pp. 99-102)

Shardt, A. "The Family Practitioner in a Multi Specialty Group: Special Services" (*Canadian Family Physician*, vol. 18, Feb. 1971, pp. 58-60)

———"Improved Health Services at Reasonable Cost" (*Canadian Doctor*, Feb. 1972, pp. 88-97)

Smith, D. and Lenczner, M. "Vacation Hazards for Travellers in Tropical, Subtropical and Underdeveloped Countries" (*Canadian Family Physician*, May 1972, pp. 65-70)

MEDICAL BIOPHYSICS

Under the direction of Professor G.R. Whitmore

In his report of last year Dr. Johns took the opportunity of thanking the staff of the Department on the occasion of his retirement as chairman. It seems only fitting therefore that on this occasion the new chairman should express the gratitude of the Department to Dr. Johns for the leadership which he provided during the formative years of the Department. It is to be hoped that the Department can continue to maintain the emphasis on excellence which was his guiding principle.

Applications for enrolment in the Department continue at a very high level and, with our limited number of student vacancies, it seems relatively easy to restrict admission to students of apparently high quality. At the same time the employment situation for our graduates remains strong although perhaps a little more difficult than several years ago. One growing source of concern is the financial pressure being applied to graduate students by both the provincial and federal governments. In this regard the recent decision by the MRC to restrict graduate student support to four years seems particularly unfortunate, especially in a department such as ours where most students are changing disciplines and may therefore be expected to require a somewhat longer graduate training period.

The last ten years has seen the Department spread from the Princess Margaret Hospital into the Medical Sciences Building, the Toronto General Hospital, and The Hospital for Sick Children. Such a geographic distribution complicates the operation of the department and seems especially difficult for certain graduate students. Since

the pressure to increase our geographic spread is likely to increase in the future, one of the problems that must be faced is to what extent such spreading is of benefit and to what extent it simply represents a dilution of effort and a subsequent reduction in the quality of the training programme. This would appear to be a problem which is not unique to our Department but is an increasing problem in all of the departments of the medical school, and it may be that some unified approach is required.

RESEARCH

Professor Aspin, with Professors Sass-Kortsak and Levison of the Department of Paediatrics, is using radionuclides of copper and the whole body counter at Toronto General Hospital to study copper metabolism in families with Wilson's disease. They are also studying the factors which influence the clearance of aerosols and particles from the respiratory tract of normal subjects and patients with cystic fibrosis. Much of this work is carried out at The Hospital for Sick Children.

Professor Bruce, with Dr. Meistrich, is continuing his studies of the processes of differentiation in the testes of mice using cell separation and biochemical techniques. He continues to be involved in the use of computers to handle patient records in the various clinics of the Ontario Cancer Treatment and Research Foundation and in the application of computers to patient control at the Princess Margaret Hospital. He also pursues the study of the effect of new chemotherapeutic agents in the treatment of cancer.

Professor Cunningham heads a group using experimental and computer methods to predict or determine radiation dose distributions within patients undergoing radiotherapy. A number of computer programmes have been developed and are in routine use for radium calculations and external beam therapy. The group is working closely with Atomic Energy of Canada Ltd. in the development of a dedicated computer system for dose calculations. They are also involved in preparing the space and special equipment for dose control of the new 35-Mev clinical linear accelerator which has just been installed at The Ontario Cancer Institute.

Professor Howatson is continuing his studies on the fine structure of cells, viruses, and macromolecules, using electron microscopy. The genetics and physiology of replication of an RNA virus are being studied by means of temperature-sensitive mutants.

Professor Hunt is studying the initial processes of radiation damage to solutions containing the components of DNA. High-energy intense bursts of electrons from the linear accelerator in the Physics Department enable him to detect reactive radiation species in water in times as short as 20 picoseconds (20×10^{-12} s). These investigations are forcing scientists to rethink many of the theories of radiation chemistry and the models for reactions in concentrated solutions which occur inside the cell. Professor Johns is studying early reactions in pyrimidine solutions exposed to very short flashes of ultraviolet light.

Professor Johns was on leave of absence for six months during 1971/72, to work with Professor J.W. Boag at the Institute of Cancer Research in London, England. While with Professor Boag, he worked on a new method of making radiological examinations, using a technique somewhat similar to xeroradiography. The method, potentially, should have all the advantages of xeroradiography in showing edge contrast, with the added advantage of requiring about one tenth the dose. At the present time the pictures lack detail, but the method is still under investigation, with the hope that this problem can be solved.

Professor McCulloch and Professor Till have continued their studies of the regulation of haemopoiesis. Two experimental approaches are being used: analysis of defective haemopoietic function in mice, using the techniques of physiological genetics, and analysis of factors affecting the growth and differentiation of haemopoietic cells in culture. The results of these basic investigations are being applied in clinical studies on acute leukaemia.

Professor Miller and Professor Phillips are studying the cellular events involved in the differentiation of the immune system. Current work centres on understanding the

relationship between the humoral and cellular immune responses. The physical methods of analysing cell populations which were developed for these studies are also being explored as clinical tools for the investigations of human blood and bone marrow.

Professor Ottensmeyer, extending the use of dark-field electron microscopy, is applying the technique to the visualization of single atoms and to the study of the fine structure of macromolecules, including the base sequence of nucleic acids such as DNA and transfer RNA.

Professor Rauth and Professor Whitmore are continuing their investigation of the effects of ionizing radiation, ultraviolet light, and various chemotherapeutic agents on mammalian cells in tissue culture as well as in solid tumours *in vivo*.

Professor Sheinin is continuing her studies on the mechanism of oncogenesis by polyoma and SV40 viruses. Investigations of the DNA metabolism of virus-infected cells has permitted identification of the terminal intermediate of polyoma DNA synthesis, the formation of which is intimately linked with aberrant patterns of cell DNA synthesis. Analyses of the surfaces of normal and virus-transformed tumour cells have revealed profound differences in the glycolipids and glycoproteins of plasma membrane and of surface component at the extreme cell periphery.

Professor Stanners is continuing his studies on the molecular biology of mammalian cells. He is concerned with the balance of macromolecular synthesis in cultured normal and malignant cells in different growth states. He is also studying cell-virus interactions with mutants of animal viruses.

Professor Taylor is continuing his investigation of the function of the heart and arterial bloodflow. Densitometry of X-ray angiographic pictures, either on cine film or as television pictures, is being studied to see if it will give more detailed information about heart volume and wall motion. Doppler ultrasound is being investigated as a means of measuring wall motion and speed of blood flow. This work is carried out at the Toronto General Hospital.

Professor Whitmore is carrying out studies on the ability of certain chemicals to act as radiation sensitizers. In particular these studies are concerned with compounds such as paranitroacetophenone and the mannich derivative of these compounds. The sensitizing ability of these compounds is restricted to anoxic mammalian cells and the hope is that they may ultimately prove useful as adjuncts to radiation therapy where there is evidence that it is the survival of anoxic cell populations which governs the response of certain tumours to radiotherapy. While Dr. Whitmore's studies are primarily concerned with *in vitro* aspects of this study, he is working with Drs. Rauth and Bush on the *in vivo* utilization of these compounds.

Dr. Whitmore, together with Drs. Thompson, Baker, Ling, Siminovitch, and Till, is continuing work on various aspects of mammalian somatic cell genetics *in vitro*. The major emphasis of this work to date has been on the isolation and characterization of auxotrophs, drug resistant and temperature-sensitive mutants both of mouse L-cells and Chinese hamster ovary cells.

HONOURS

PROFESSOR E.A. McCULLOCH was elected member of the Executive Committee of the International Society for Experimental Hematology, December 1971.

PROFESSOR G.F. WHITMORE was elected a Fellow of the Royal Society of Canada, April 1972; elected member of The Commission on Radiation Biophysics of the International Union for Pure and Applied Biophysics, May 1972.

SCHOLARLY ADDRESSES

PROFESSOR N. ASPIN, with D.B. Yeates, A.C. Bryan, and H. Levison, "Regional Clearance of Ions from the Airways of the Lung," American Thoracic Society, Kansas City, May 1972; "Data Acquisition, Storage, and Analysis Techniques for Gamma-ray Camera Systems," C.A.P., Edmonton, June 1972.

PROFESSOR W.R. BRUCE, "Quantitative Cellular Studies of the Action of Hormones on the Mouse Testis," Gordon Research Conferences, New London, New Hampshire, August 1971; "Spermatogenesis in the Mouse," First International Conference on Cell Differentiation, Nice, France, September 1971; "Inexpensive Application of Computers to Medical Records with the Use of Optical Character Recognition and Microfiche - Four Years' Experience at the Ontario Cancer Institute," 6th International Congress on Medical Records, Sydney, Australia, May 1972.

PROFESSOR J. HUNT, with P.C. Shragge, "Reactions of the Hydrated Electron with Polynucleotides," Radiation Research Conference, Boston, May 1971; the cic Symposium on Pulse Radiolysis, Pinawa, Manitoba, October 1971; with J.E. Aldrich and R.K. Wolff, "Primary Processes in Alcohols Studied by Picosecond Pulse Radiolysis," the cic Symposium on Pulse Radiolysis, Pinawa, Manitoba, October 1971; with R.K. Wolff and J.E. Aldrich, "Anomalous Fast Production of Cl_2^- , Br_2^- , $(\text{CNS})_2^-$ Absorptions," the cic Symposium on Pulse Radiolysis, Pinawa, Manitoba, October 1971; "Radiation Chemistry at Picosecond Times," The University of Saskatchewan, Department of Chemistry, Saskatoon, Saskatchewan, October 1971; "Radiation Reactions at the Speed of Light," University of Manitoba, Department of Chemistry, Winnipeg, Manitoba, October 1971; "Picosecond Reactions in Radiation Chemistry and Biology," Guelph University, Department of Physics, Guelph, Ontario, March 1972; "Models for the Picosecond Reactions of Scavengers in Concentrated Solutions," Elementary Processes of Radiation Chemistry Conference, Notre Dame, Indiana, April 1972.

PROFESSOR H.E. JOHNS, "Photochemistry of Excited States of Nucleic Acids," International Congress for Pure and Applied Chemistry, Boston, Mass., July 1971; with D.W. Whillans, J.C. LeBlanc, M.A. Herbert, and B.W. Taylor, "Techniques in Flash Photolysis," Chemical Institute of Canada Pulse Radiolysis Symposium, Pinawa, Manitoba, October 1971; with G. Fisher and M. Herbert, "Excited States of Pyrimidines," cic Pulse Radiolysis Symposium, Pinawa, Manitoba, October 1971. On sabbatical January-May 1972.

PROFESSOR E.A. McCULLOCH, "Colony Formation by Hemopoietic Cells: Past and Future," International Society for Experimental Hematology, Davis, California, December 1971; "Leukemia: Defective Differentiation," Oncology Lecture Series, National Institutes of Health, National Cancer Institute, Bethesda, Maryland, January 1972; "Remission in Acute Myelogenous Leukemia: II. Changes in Cells Forming Colonies in Culture (CFU-C)," Royal College of Physicians and Surgeons Annual Meeting, Toronto, January 1972; "Hemopoietic Stem Cells in Mouse and Man," Walter and Eliza Hall Institute for Cancer Research, Melbourne, Australia, March 1972; "Leukemia Considered as Defective Differentiation: Complementary *in vivo* and Culture Methods Applied to the Clinical Problem," International Cancer Conference, Sydney, Australia, March 1972; "Functional Studies of Hemopoietic Stem Cells Applied to the Problem of Human Leukemia," Veterans Administration Hospital, Seattle, Washington, March 1972; "The Regulation of Early Events in Hemopoiesis," Jackson Memorial Laboratories, Bar Harbor, Maine, April 1972.

PROFESSOR A.F. HOWATSON, with C.P. Stanners, Report on the Gordon Conference on Animal Cells and Viruses, Department of Medical Biophysics, Toronto, Ontario, September 1971; "Replication of Vesicular Stomatitis Virus: Properties and Role of Defective-interfering Particles," University of Sherbrooke, Sherbrooke, Quebec, March 1972; "Defective Particles: Characteristics and Role in Infection," 1st International Colloquium on Rhabdoviruses, Roscoff, France, June 1972; "Replication of Vesicular Stomatitis Virus: Role of Defective-interfering Particles," National Institute for Medical Research, Mill Hill, London.

DR. V. LING, "DNA Sequencing," Cold Spring Harbor Labs, New York, December 1971; "Some Approaches to DNA Sequencing," NRC Laboratories, Ottawa, February 1972; "DNA Sequencing: Biochemical," Toronto Biochemical and Biophysical Society, Toronto, May 1972.

DR. M. MEISTRICH, "Pure Populations of Mouse Testis Cells for Studies of Cell

Differentiation," Harvard University Medical School, Boston, Mass., October 1971; and at, Massachusetts Institute of Technology, Cambridge, Mass., October 1971; and, University of Missouri, Columbia, Mo., November 1971; and Oak Ridge National Laboratory, Oak Ridge, Tenn., November 1971; and University of Texas at Dallas, Dallas, Texas, November 1971; and McGill University, Montreal, Quebec, January 1972; and McMaster University, Hamilton, Ontario, February 1972; and York University, Toronto, Ontario, March 1972; and University of California at Los Angeles, Los Angeles, Calif., March 1972; University of Minnesota, St. Paul, Minn., March 1972; Medical College of Ohio at Toledo, Toledo, Ohio, April 1972; Massachusetts Institute of Technology, Cambridge, Mass., May 1972; The Population Council, New York, N.Y., May 1972; University of Rochester, Rochester, N.Y., May 1972; The Wistar Institute, Philadelphia, Pa., June 1972; M.D. Anderson Hospital & Tumor Institute, Houston, Texas, June 1972.

PROFESSOR R.G. MILLER, "Cell Separation Studies of the Immune Response," Can. Fed. of Biol. Soc., Toronto, June 1971; "Cell Separation – Methods and Applications," Eighth Annual Pathobiology Conference, Aspen, Colorado, August 1971; "The ABT of Immunology," Ontario Antibody Club, February 1972; "Cell Separation on the Basis of Sedimentation and Density," Biophysical Society, Toronto, Ontario, February 1972; "Cell Spectroscopy," Physics Division, A.E.C.L., Chalk River, March 1972; "Cell Spectroscopy," Department of Physiology, Queen's University, Kingston, March 1972; 3rd International Convocation on Immunology, Buffalo, N.Y., June 1972; "Physical Methods of Separating Cells," IV International Congress of Endocrinology, Washington, D.C., June 1972.

PROFESSOR F.P. OTTENSMEYER, "Atomic and Molecular Electron Microscopy," Physics Department, Carleton University, Ottawa, December 1971; "Dark Field Electron Microscopy of Atoms and Molecules," Department of Pathology, Queen's University, Kingston, January 1972; "Atomic and Molecular Analysis in Biological Electron Microscopy," Sloan Kettering Institute for Cancer Research, New York, N.Y., June 1972; with R.M. Henkelman, R.F. Whiting, E.E. Schmidt, "Images of Atoms – Uranium to Sulphur," Biophysical Society Meeting, Toronto, February 1972; with D.R.S. Hart, "The Excision of the Lambda Prophage," Biophysical Society Meeting, Toronto, February 1972.

PROFESSOR R.A. PHILLIPS, "*In vitro* Studies of the Immune Response," Cold Spring Harbor Laboratory, New York, N.Y., May 1971.

PROFESSOR A.M. RAUTH, "Studies of Sensitizer Action on a Mouse Solid Tumor," Conference on Chemical Sensitization of Anoxic Tumor Cells to Radiation, Toronto, April 1972.

PROFESSOR R. SHEININ, "Interaction of Concanavalin A with Surface Components and Plasma Membrane Preparations of Normal 3T3 Mouse Fibroblasts and 3T3 Cells Transformed by SV40 and Polyoma Viruses," Cold Spring Harbor Laboratory, New York, N.Y., June 1972; "Studies on the Surface of Normal Mouse Cells and those Transformed by Oncogenic Viruses," Department of Physiological Chemistry, University of Leiden, The Netherlands, September 1971; "Studies on the Surface Moieties of Normal and Virus-transformed Mouse Fibroblasts," 1st International Conf. on Cell Differentiation, Nice, France, September 1971; "What I did in Nice," Department of Medical Biophysics, Toronto, Ontario, October 1971; "The Oncoina Virus," Department of Microbiology, University of Toronto, November 1971; "The Oncogenic DNA-containing Viruses," Department of Microbiology, University of Toronto, Toronto, December 1971; "Comparative Studies on Surfaces of Normal and Virus-transformed Cells," The Fox Chase Institute for Cancer Research, Philadelphia, December 1971; "Do Viruses Cause Cancer?" Clinical Seminar Group, Princess Margaret Hospital, Toronto, March 1972; "Cell Surfaces and Cancer," Medical Biophysics Department, Toronto, April 1972; Canadian Cancer Society, Barrie, Ontario, May 1972; "The Replication of Polyoma DNA," Toronto Biochemical and Biophysical Society, Toronto, May 1972; "Polyoma DNA Synthesis: The Protein Requirement," Canad. Fed. Biol. Societies, Quebec City, June 1972; "Protein Requirements

for Polyoma DNA Synthesis," The Vallée Theatre, Medical School, Laval University, Québec, June 1972; "Biochemical Comparisons between the Surface of Normal and Virus-transformed 3T3 Mouse Fibroblasts," Cold Spring Harbor Laboratory, New York, N.Y., June 1972.

PROFESSOR C. STANNERS, "Protein Synthesis in Proliferating and Resting Fibroblasts," The 4th Saratoga Conference on Molecular Biology and Pathology, Saratoga Springs, New York, August 1971; "Involvement of Translation in Growth Control of Animal Cells," Toronto Biophysical and Biochemical Society Symposium, York University, Toronto, November 1971; "Actinomycin D: Experimental and Clinical Considerations," Clinical and Research Staff, the Ontario Cancer Institute, February 1972; "Some Molecular Aspects of the Growth Cycle of Animal Cells in Culture," Institut du Cancer de Montréal, Notre Dame Hospital, Montreal, March 1972; "Persistent Infection with a Non-cytocidal ts Mutant of VSV," The Vallée Theatre, Medical School, Laval University, Québec, June 1972; "Quiescent States and the Cell Cycle," Symposium on the Cell Cycle at Canadian Federation of Biological Societies, Quebec, June 1972.

PROFESSOR K. TAYLOR, "Patient Monitoring," Conference on Hospital Features '72, Ontario Hospitals Association, Toronto, February 1972; "Pacemaker Pulse Wave Analysis," Conference on Pacemaker Therapy, University of Toronto Faculty of Medicine, April 1972.

PROFESSOR J.E. TILL, "Comparison of the Origin of the CFU-C," "Regulation of Haemopoiesis: CFU Repression," Workshop on *In vitro* Cultures of Haemopoietic Cells, Rijswijk, The Netherlands, October 1971; "Membrane Properties of Ouabain Resistant L-cells," Biophysical Society, Toronto, February 1972; "Genetic Regulation of Membrane Function," Connaught Medical Research Labs, Willowdale, Ontario, April 1972; "Genetic Regulation of Membrane Function," FASEB Conf., Atlantic City, April 1972; "Cellular Biology of Mammalian Cells: Basic Studies and Practical Applications," Manitoba Cancer Treatment and Research Foundation, Manitoba, April 1972; "Cellular Biology of the Blood-forming System," Lady Davis Institute, Montreal, Quebec, May 1972; "Genetic Regulation of Membrane Function," Best Institute, Toronto, June 1972.

DR. L.H. THOMPSON, "Studies on Mutants of Somatic Mammalian Cells," Physics Department, University of Texas at Houston, M.D. Anderson Hospital and Tumor Institute, Houston, Texas, December 1971.

PROFESSOR G.F. WHITMORE, "Isolation and Characterization of Temperature-sensitive Mutants of Mammalian Cells," Canadian Association of Cell Biologists, Toronto, June 1971; "The Role of the Physicist in Cancer Treatment," McGill Physical Society, March 1972; "The Biological Response to Ionizing Radiation," Frontiers in Biological Sciences, Cleveland, December 1971; "Radiobiology for Radiotherapists," Montreal Lectures in Radiobiology, Montreal, 1971.

STAFF CHANGES

Leaves of absence

Professor H.E. Johns was on leave of absence for six months during 1971/2 to work with Professor J.W. Boag at the Institute of Cancer Research in London, England.

Promotions

Professor J.W. Hunt – from Associate Professor to Full Professor.

Professor R.G. Miller – from Assistant Professor to Associate Professor.

Professor R.A. Phillips – from Assistant Professor to Associate Professor.

New Appointments

Drs. R. Baker, V. Ling, M. Meistrich, and L. Thompson were appointed Lecturers.

Professor F.P. Ottensmeyer was appointed Graduate Secretary, succeeding Professor G.F. Whitmore.

Professor G.F. Whitmore was appointed Chairman, succeeding Professor H.E. Johns.

PUBLICATIONS

- Aldrich, J., Bronskill, M.J., Wolff, R.K., and Hunt, J.W. "Picosecond Pulse Radiolysis. III. Reaction Rates and Reduction in Yields of Hydrated Electrons" (*Journal of Chemical Physics*, vol. 55, 1971, 530-9)
- Amato, D., Cowan, D.H., and McCulloch, E.A. "Separation of Immunocompetent Cells from Human and Mouse Hemopoietic Cell Suspensions by Velocity Sedimentation" (*Blood*, vol. 39, 1972, pp. 472-80)
- Austin, P.E., McCulloch, E.A., and Till, J.E. "Stimulation of Uptake of Tritiated Thymidine into Mouse Marrow Cells in Cultures by a Factor from L Cell Conditioned Medium" (*Journal of Cellular Physiology*, vol. 79, 1972, 181-8)
- Brunette, D.M. and Till, J.E. "A Rapid Method for the Isolation of L-Cell Surface Membranes using Aqueous Two-Phase Polymer System" (*Journal of Membrane Biology*, vol. 5, pp. 215-24)
- Chiu, S.F.H. and Rauth, A.M. "Nascent DNA Synthesis in Ultraviolet Light Irradiated Mouse L Cells" (*Biochimica et Biophysica Acta*, vol. 259, 1972, pp. 164-74)
- "A Comparison of the Sensitivity to Ultraviolet Light of Mouse L Cells and Mouse Bone Marrow Cells Assayed *in vitro*" (*Radiation Research*, vol. 47, 1971, pp. 110-22)
- Cunningham, J.R., Shrivastava, P.N., and Wilkinson, J.M. "Program IRREG - Calculation of Dose from Irregularly Shaped Radiation Beams" (*Computer Programs in Biomedicine*, vol. 2, 1972, pp. 192-9)
- Cunningham, J.R. "Computers in Radiotherapy"; in *Proceedings of the 4th International Conference on Computers in Radiotherapy*, Special Report No. 5, 1971
- Gorczynski, R.M., Miller, R.G., and Phillips, R.A. "Identification by Density Separation of Antigen-Specific Surface Receptors on the Progenitors of Anti-Body Producing Cells" (*Immunology*, vol. 20, 1971, pp. 693-705)
- "In vivo Requirement for a Radiation Resistant Cell in the Immune Response to Sheep Erythrocytes" (*Journal of Experimental Medicine*, vol. 134, 1971, pp. 1201-21)
- "Initiation of Antibody Production to Sheep Erythrocytes *in vitro*: Replacement of the Requirement for T-Cells with a Cell-Free Factor Isolated from Cultures of Lymphoid Cells" (*Journal of Immunology*, vol. 108, 1972, pp. 547-51)
- Gray, I.G., Mitra, S.K., Nisbet, H.I.A., Aspin, N., and Creighton, R.E. with the technical help of G. Volgyesi "The Effect of Methoxyflurane on Cerebral Blood Flow in the Dog" (*Canadian Anaesthetists' Society Journal*, vol. 18, 1971, pp. 408-18)
- "Cerebral Blood Flow in Hypoxemic Anesthetized Dogs" (*Anesthesia and Analgesia ... Current Researches*, vol. 50, 1971, pp. 594-608)
- Gregory, C.J. and Ebert, M. "Comparative Studies of the Effects of 14 MeV Neutrons and 300 KVP X-rays on the Mouse Immune Response to Sheep Red Cell Antigens" (*International Journal of Radiation Biology*, vol. 20, 1971, pp. 291-6)
- Gregory, C.J., McCulloch, E.A., and Till, J.E. "Repressed Growth of C57BL Marrow in Hybrid Hosts Reversed by Antisera directed against non-H-2 Alloantigens" (*Transplantation*, vol. 13, 1972, pp. 138-41)
- Henkelman, R.M. and Ottensmeyer, F.P. "Visualization of Single Heavy Atoms by Dark Field Electron Microscopy" (*Proceedings of the National Academy of Science, USA*, vol. 68, 1971, pp. 3000-4)
- Herbert, M.A. and Johns, H.E. "Flash Photolysis Studies of Orotic Acid" (*Photochemistry and Photobiology*, vol. 14, 1971, pp. 693-704)
- Hunt, J.W., Greenstock, C.L., and Bronskill, M.J. "Design Considerations for Nanosecond Pulse Radiolysis" (*International Journal of Radiation Physics and Chemistry*, vol. 4, 1972 pp. 87-105)
- Johns, H.E. "Quantum Yields and Kinetics of Photochemical Reactions in Solution"; in *Creation and Detection of the Excited State*, ed. A.A. Lamola, vol. 1, pt. 1, pp. 123-72. New York: Dekker 1971
- Johns, H.E. "Photochemistry of Excited States of Nucleic Acid Components"; in *XXIII International Congress of Pure and Applied Chemistry*, vol. 8, pp. 11-18. International Union of Pure and Applied Chemistry 1971
- Lafleur, L., Miller, R.G., and Phillips, R.A. "A Quantitative Assay for the Progenitors of Bone Marrow-Associated Lymphocytes" (*Journal of Experimental Medicine*, vol. 135, 1972, p. 1363)
- Lam, D.M.K. and Bruce, W.R. "The Biosynthesis of Protamine During Spermatogenesis of the Mouse: Extraction, Partial Characterization and Site of Synthesis" (*Journal of Cellular Physiology*, vol. 78, 1971, pp. 13-24)
- Lin, H. and Bruce, W.R. "Effect of Amethopterin on Cells of Experimental Tumors" (*Annals of the New York Academy of Sciences*, vol. 186, 1971, pp. 325-9)
- Ling, V. "Fractionation and Sequences of the Large Pyrimidine Oligonucleotides from Bacteriophage fd DNA" (*Journal of Molecular Biology*, vol. 64, 1972, pp. 87-102)

- "Pyrimidine Sequences from the DNA of Bacteriophages fd, fl and ØX174" (*Proceedings of the National Academy of Science*, vol. 69, 1972, pp. 742–6)
- Marceau, N. and Aspin, N. "Distribution of Ceruloplasmin-Bound ^{67}Cu in the Rat" (*American Journal of Physiology*, vol. 222, 1972, pp. 106–10)
- McBurney, M., Graham, F.L., and Whitmore, G.F. "Anomalous Sedimentation of High Molecular Weight Denatured Mammalian DNA" (*Biochemical and Biophysical Research Communications*, vol. 44, 1971, pp. 171–8)
- "Sedimentation Analysis of DNA From Irradiated and Unirradiated L-Cells" (*Biophysical Journal*, vol. 12, 1972, pp. 369–83)
- McBurney, M.W. and Whitmore, G.F. "Molecular Weight Analysis of Mammalian DNA" (*Biochemical and Biophysical Research Communications*, vol. 46, 1972, pp. 898–904)
- McCool, D., Bruce, W.R., and Painter, R.H. "The Large Scale Preparation of Erythropoietin Suitable for Use in Tissue Culture" (*Experimental Hematology*, vol. 20, 1971, pp. 130–8)
- McCulloch, E.A. and Till, J.E. "Regulatory Mechanisms Acting on Hemopoietic Stem Cells. Some Clinical Implications" (*American Journal of Pathology*, vol. 65, 1971, pp. 601–19)
- Meistrich, M.L. "Contribution of Thymine Dimers to the U.V. Inactivation of Mutants of Bacteriophage T4" (*Journal of Molecular Biology*, vol. 66, 1972, pp. 97–106)
- "Control of the Kinetics of Spermatogenesis Analysed by Sedimentation Velocity of Spermatogenic Cells and Nuclei" (*Genetics*, vol. 68, 1971, S43) (abstract)
- Meistrich, M.S. and Drake, J.W. "Mutagenic Effects of Thymine Dimers in Bacteriophage T4" (*Journal of Molecular Biology*, vol. 66, 1972, pp. 107–14)
- Meistrich, M.L. and Eng, V.W.S. "Separation of Nuclei of Mouse Testis Cells by Velocity Sedimentation" (*Experimental Cell Research*, vol. 70, 1972, pp. 237–42)
- Meistrich, M.L. and Lamola, A.A. "Triplet State Sensitization of Thymine Photodimerization in Bacteriophage T4" (*Journal of Molecular Biology*, vol. 66, 1972, pp. 83–95)
- Meistrich, M.L. and Rauth, A.M. "Ultraviolet Photochemistry of DNA in Mouse Spermatozoa" (*Mutation Research*, vol. 14, 1972, pp. 133–6)
- Mitra, S.K., Gray, I.G., Nisbet, H.I.A., Creighton, R.E., and Aspin, N. (with Volgyesi, G.) "The Effect of Hypoxaemia on the Cerebral Blood Flow of the Dog under Methoxyfluorane Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 18, 1971, pp. 419–25)
- Ogawa, M., Bergsagel, D.E., and McCulloch, E.A. "Differential Effects of Melphalan on Mouse Myeloma (adj. Pc-5) and Hemopoietic Stem Cells" (*Cancer Research*, vol. 31, 1971, pp. 2116–19)
- Park, C.H., Bergsagel, D.E., and McCulloch, E.A. "Ascorbic Acid: A Requirement for Colony Formation by Mouse Plasmacytoma Cells" (*Science*, vol. 174, 1971, pp. 720–2)
- Phillips, R.A. and Cowan, D.H. "Human Bone Marrow Transplantation" (*Medical Clinics of North America*, vol. 56, 1972, pp. 433–51)
- Rawlinson, J.A. and Cunningham, J.R. "An Examination of Synchronous Shielding in ^{60}Co Rotational Therapy" (*Radiology*, vol. 102, 1972, pp. 667–71)
- Rawlinson, J.A. and Cunningham, J.R. "A Direct Experimental Evaluation of Computed Cobalt-60 Rotation Dose Distributions" (*Phys. Med. Biolog.*, vol. 16, 1971, pp. 511–19)
- Sheinin, R. "Studies on the Surface Moieties of Normal and Virus-Transformed Mouse Fibroblasts"; in *Proceedings, 1st International Conference on Cell Differentiation*, Copenhagen 1971
- Sheinin, R. "Why Many Virologists think Some Human Cancers May be Caused by Viruses" (*Science Forum*, vol. 4, 1971, pp. 9–11)
- Shrage, P., Michaels, H., and Hunt, J.W. "Factors Affecting the Rate of Hydrated Electron Attack on Polynucleotides" (*Radiation Research*, vol. 47, 1971, pp. 598–611)
- Shuve, S.J. and Rauth, A.M. "The Effects of Phleomycin on Mouse L-Cells" (*Cancer Research*, vol. 31, 1971, pp. 1422–8)
- Sutherland, D.J.A., Till, J.E., and McCulloch, E.A. "Short-Term Cultures of Mouse Marrow Cells Separated by Velocity Sedimentation" (*Cell and Tissue Kinetics*, vol. 4, 1971, pp. 479–90)
- Taylor, K.W. "Electrical Hazards Throughout the Hospital" (*Modern Medicine of Canada*, vol. 26, 1971, pp. 19–27)
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MEDICAL CELL BIOLOGY

Under the direction of Professor L. Siminovitch

RESEARCH

Professor J.P. Carver is concerned with the molecular basis of protein function and with the state of organization of cell water. Using a large spin echo spectrometer, he has been examining the role of Mn^{++} ions in the regulation of the allosteric enzyme phosphoenolpyruvate carboxylase, of Ca^{++} and Mn^{++} in the action of Concanavalin A, and the variations in the water relaxation times of cells from a variety of tissues and cell cultures.

Professor B. Cinader has continued his studies on receptor properties using affinity, allotypic specificity, and tolerance induction as markers. In collaboration with Drs. C.-T. Chou and S. Dubiski, the relative quantities of plaque-forming antibody with different allelic allotypes of the light chain were being studied. It was shown that there is a difference in the number of receptors with different allelic allotypic specificities. In collaboration with Dr. C.-Y. Wu, the maturation of avidity of IgM was examined; time- as well as dose-dependent changes in the avidity of IgM was demonstrated. In collaboration with Dr. A.M. Kaplan, unresponsiveness of T and B cells of tolerant animals was demonstrated by reconstitution of irradiated donors with bone marrow cell fractions and with thymus cells from tolerant and normal donors. The effect of graft *vs.* host reaction on allotypic suppression was explored and escape from suppression as a consequence of graft *vs.* host reaction was discovered. The magnitude of this effect is related to the magnitude of the graft *vs.* host reactions as assessed by spleen enlargement.

Professor C.R. Fuerst continued studies on the biochemical genetics of bacterial virus growth with temperature-sensitive mutants of both virus and host cells. Emphasis was placed mainly on genetic mapping of genes of the virus or host that are required in virus morphogenesis and on analyses of the function and structure of the proteins for which these genes code.

Professor M. Gold is carrying out research on site-specific reactions occurring at the level of macromolecular DNA. The introduction of methyl groups by highly specific enzymes appears to play a role in host-controlled modification and restriction mechanisms involved in recognition by cells of foreign DNA. Two distinct DNA methylase systems appear to be present inside bacteria and these enzymes are being purified. Other enzymes which catalyse site-specific reactions on DNA are endonucleases introducing cuts or nicks at unique locations along the length of the DNA molecule. One such nuclease is now being studied and it appears to introduce only a single break in a circular DNA molecule. Other nucleases under study appear to cut long concatenated viral replicative intermediates into mature-length pieces of DNA.

Professor L.A. MacHattie is continuing research on the structure of the chromosomes of bacteriophage viruses P-1 and D-108, and on genetic work with P-1.

Professor M.L. Pearson's interests lie in understanding at the molecular level the regulation of genetic activity in bacteriophage lambda. The studies on the transcription *in vivo* of the structural genes coding for phage head formation, coupled with the work of others on the relative amounts of protein from this set of genes, indicate that there is a hitherto unsuspected but potent translation control mechanism regulating genetic activity in this region of the genome. Other experiments dealing with the control of the synthesis of λ DNA coded-enzymes in cell-free extracts supplemented with λ DNA have allowed us to develop a direct activity assay for one of the key positive-acting regulators of early phage transcription. This assay is being used to follow the purification of this protein, the product of gene N, in order to allow us to work out its precise molecular mechanism of action.

Another line of research has been initiated with the aim of defining the molecular

determinants of synapse formation in the nervous system, using as a model system cell cultures of mouse neuroblastoma and rat myoblast. In collaboration with Professor B.D. Sanwal, we are studying the properties of the plasma membranes of these cell lines, using both biochemical and genetic methods of analysis.

Professor B.D. Sanwal is continuing his studies of genetic and biochemical controls of permeation mechanisms in *Escherichia coli*. The molecular mechanisms involved in the allosteric activation of enzymes are being studied by physical chemical methods. Studies have also begun on the isolation of membrane defective mutants in mouse neuroblastoma cell lines.

Professor Louis Siminovitch, in collaboration with Professors G.F. Whitmore and J.E. Till, is engaged in studies of the genetics of somatic cells. Temperature-sensitive conditional lethal mutants as well as mutants involving resistance to Concanavalin A, ouabain, amanitin and auxotrophy have been isolated. A preliminary characterization of some of these mutants has been made. Methods are being developed for the isolation of a broad spectrum of other mutants, including temperature-sensitive conditional lethals for specific functions, and for their biochemical characterization.

Professor M.W. Thompson is continuing her study, begun last year, on long-term cultures of human lymphoblastoid cells, to determine their usefulness in the investigation of genetic disorders at the cellular level. So far this work has been concerned with modification of basic cell-culture techniques for quantitative studies in this system, and examination of the characteristics in which these cells are believed to be superior to fibroblast cultures, namely, growth in suspension, constancy of karyotype, and indefinite life span. Preliminary studies indicate that these lines may undergo extensive changes in karyotype during cell culture, and that though they survive in culture for many cell generations, they do eventually senesce.

Professor B.J. Underdown is continuing studies into the biologic significance of secretory IgA and the structure and conformation of antibody active sites.

HONOURS

PROFESSOR B. CINADER served as Chairman of the following Workshop Sessions and Meetings: "Tumour Immunology," at the 9th Canadian Cancer Research Conference, Honey Harbour, Ontario; Symposia on "Cellular Aspects of the Antibody Response" and "Recent Advances in Immunology," at the Canadian Federation of Biological Societies annual meeting, Toronto, Ontario; Workshop on "Antienzymes: A survey of Antienzyme Research," at the 1st International Congress of Immunology, Washington, D.C. Professor Cinader was re-elected President of the International Union of Immunological Societies; appointed Director of the Institute of Immunology of the School of Graduate Studies, University of Toronto; a Member of the Expert Panel of the World Health Organization; Honorary Member of the Advisory Committee of the Center for Immunology, State University of New York at Buffalo; and "nucleus" member of the Special Committee in Clinical Immunology, The Royal College of Physicians and Surgeons of Canada; MRC Visiting Professor at the University of Western Ontario, London, Ontario; and was awarded a Pfizer Fellowship at the Institut de Recherches Cliniques de Montréal, Montréal, P.Q. He was elected to the Advisory Board of the Bollettino of the Istituto Sieroterapico Milanese and of the serial publication *Research in Immunochemistry and Immunobiology*.

PROFESSOR L. SIMINOVITCH was Visiting Professor, Collège de France, Paris, France; appointed a Member of the Board of Directors of the Canadian Weizmann Institute; Chairman, Canadian Communicable Diseases Centre, Review Committee of the Medical Research Council of Canada; Chairman, Medical Advisory Group, National Cancer Institute of Canada; invited participant to meeting of the Advisory Group on Somatic Cell Genetics of the National Cancer Institute, National Institutes of Health, United States, Bethesda, Md.

PROFESSOR M.W. THOMPSON was appointed to the Board of Directors, Queen

Elizabeth II Fund for Research in Diseases of Children; and President-elect, Genetics Society of Canada for the year 1971-2.

SCHOLARLY ADDRESSES

J.P. CARVER, "Applications of Nuclear Magnetic Resonance and Relaxation to the Study of Biological Systems," Department of Chemistry, University of Guelph, Guelph, Ontario.

B. CINADER, "The Tasks of the First Congress of Immunology" (opening remarks); "The Mechanism of Enzyme-Antienzyme Reactions" (opening remarks for the Workshop on Antienzymes); "Recent Advances in the Study and Application of Antibody Enzyme Interaction" (reporting session), 1st International Congress of Immunology, Washington, D.C.; "Whither Immunology?" Ontario Cancer Research and Treatment Foundation, Lake Couchiching, Ontario; "Tumour Immunology," Canadian Cancer Society's 2nd Canadian Science Writers' Symposium, Toronto, Ontario; "The Possibilities of Tumour Immunology in the Medicine of Tomorrow," and "Receptors on Precursors to Antibody-Forming Cells," University of Connecticut, Hartford, Conn., U.S.A.; "The Future of Tumour Immunology," Academy of Medicine, Toronto, Ontario; "Aspects of the Receptor Concept in the Humoral Immune Response," and "General Problems of Tumour Immunology," University of Western Ontario, London, Ontario; "The Role of the Receptor in the Immune Response," and "The Future of Tumour Immunology," Institut de Recherches Cliniques de Montréal, Montréal, P.Q.

M. GOLD, "The Physiology of Bacteriophage Lambda Infection," Columbia University, New York, N.Y.; The Albert Einstein College of Medicine, New York, N.Y.; "Cancer Genes," B'nai Brith Hillel Foundation, Toronto, Ontario.

M.L. PEARSON, "Cyclic AMP and the Growth of Bacteriophage Lambda," Biophysical Society, Toronto, Ontario.

M.L. PEARSON, G. YOGESWARAN, R.K. MURRAY, B.D. SANWAL, F.A. McMORRIS, and F. RUDDLE, "Glycosphingolipids of Mouse Neuroblastoma Cells and Neuroblastoma X L Cell Hybrids," Cell Surface Meeting, Cold Spring Harbor, N.Y.

B.D. SANWAL, "Regulation of Phosphoglucose mutase," Joint Meeting of Biochemical Society, United Kingdom and Biochemical Society, India, Bangalore, India; "Mechanism of Dicarboxylate Transport in Bacteria," Biology Division, University of Delhi, Delhi, India; "Genetic and Biochemical Studies of Succinate Transport in *Escherichia coli*," Department of Biochemistry, University of Western Ontario, London, Ontario.

L. SIMINOVITCH, "Life Cycle of Viruses," and "Viruses and Neoplasia," University of Toronto, Toronto, Ontario; "The Isolation and Characterization of Mutants of Somatic Cells," 9th Canadian Cancer Conference, Honey Harbour, Ontario; "The Present State of Science in Relation to Genetic Manipulation," University College Alumnae Association, 1972 Symposium on Genetic Engineering, Toronto, Ontario; "Genetics and the Future of Man," Program for Studies in Social Action, University of Windsor, Windsor, Ontario; "La génétique des cellules somatiques," Visiting Professor, Collège de France, Paris, France; "Genetics of Somatic Cells," International Cancer Fund, Oxford University, Oxford, England.

M.W. THOMPSON, "Genetic Counselling in Duchenne Muscular Dystrophy," Muscular Dystrophy Association of America, Clinical Directors' Conference, New York, N.Y.; "Human Genetics and the Quality of Life," Canadian Humanities Association, Guelph, Ontario; "New Genetics in Theory and Practice," University of Toronto Alumnae Association in Montreal, Montreal, P.Q.; "Dermatoglyphics and XYY Karyotypes," 4th International Congress of Genetics, Paris, France.

B.J. UNDERDOWN, "IgE and Atopic Disease," Midwest Allergy Forum Symposium, Toronto, Ontario; "Antibody Systems in Atopic Disease," Annual Meeting, Royal College of Physicians and Surgeons, Toronto, Ontario.

PUBLICATIONS

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- Chen, A., Thompson, M.W., and Rose, V. "Endocardial Fibroelastosis: Family Studies with Special Reference to Counselling" (*Journal of Pediatrics*, vol. 79, 1971, pp. 385-92)
- Cinader, B. "The Future of Tumour Immunology" (*Medical Clinics of North America*, vol. 56, 1972, pp. 801-36)
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- Murialdo, H. and Siminovitch, Louis. "The Morphogenesis of Bacteriophage Lambda. III. Identification of Genes Specifying Morphogenetic Proteins" in *The Bacteriophage Lambda*, pp. 711-23. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y. 1971
- "The Morphogenesis of Bacteriophage Lambda. IV. Control of the Expression of the Morphogenetic Information in Phage λ ; v. Form-Determining Function of the Genes Required for the Assembly of the Head of Phage λ " (*Virology*, vol. 48, 1972, pp. 785-823; 824-35)
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- Sanwal, B.D. "The Regulation of Branched and Converging Pathways"; in *Current Topics in Cellular Regulation*, ed. B.L. Horecker and E.A. Stadtman, pp. 1-115. New York: Academic Press 1971
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- Wu, C.-Y. and Cinader, B. "Antigenic Promotion. Increase in Hapten Specific Plaque-Forming Cells after Preinjection with Structurally Unrelated Macromolecules" (*Journal of Experimental Medicine*, vol. 134, 1971, pp. 693-712)
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MEDICAL MICROBIOLOGY

Under the direction of Professor N.A. Hinton

A major reorganization of the Department has taken place in the last two years. Chronic deficiencies in staff, space, and organization have existed for some time with a primary deficiency related to the lack of co-ordinated, cohesive departmental structure and a lack of definition of primary responsibility.

Considering the major handicaps involved, the level of quality activity, sustained through this difficult period, in this Department, in its units in the University-affiliated hospitals and in the teaching programme, has been remarkable. Service units have been sustained at an effective level, the teaching programme prosecuted with vigour, and an enormous show of good will and personal responsibility and a number of individual efforts in research have been highly productive.

The remarkable potentiality of the largest group of medical microbiologists in the country, however, remained underdeveloped and incapable of the evolution of undergraduate, postgraduate, research and service programmes required at a level of quality commensurate with the size and responsibility of the University of Toronto, Faculty of Medicine.

A definition of objectives towards which our development can be focused is now seen more clearly by the Department and may be outlined as follows:

1. To provide effective formal teaching to medical students in the area of applied medical microbiology. This area encompasses predominantly the diagnosis, management, epidemiology, and prevention of infectious disease, with emphasis on the practice of laboratory medicine.
2. To support the teaching and patient care operations of the other clinical departments through the effective provision of diagnostic microbiology service in all the teaching hospitals and through the normal consultant activity of the medical microbiologists.
3. To support and contribute to the residency training programmes in the various clinical departments and to mount a specific programme in medical microbiology.
4. To develop research programmes in clinical microbiology with a major applied emphasis relating to diagnostic microbiology and the diagnosis, management, pathogenesis, and control of infectious disease.
5. To contribute to the development of effective professional courses for the various health science students, in particular, nurses, pharmacists, and dentists.

To meet these responsibilities, the Department of Medical Microbiology has been conceived as a clinical department on a primary hospital base. As its teaching effort was meant to be directed predominantly towards medical students in Periods II and III, and residents, and its research conducted in relation to diagnostic microbiology and patient care, the total physical plant of the Department is intended to be housed in teaching hospital units. Each hospital unit should thus be considered as a service/research/teaching organization and the total integrated effort of all of these units makes up the Department.

The progress made toward the above objectives may be described as follows:

- (a) *Undergraduate Medical Student programme.* Members of the Department carry predominant responsibility for the Infections System teaching in Period IIA, a programme of 120 hours for 230 students.

Conventional laboratory exercises have been essentially deleted and the bulk of the programme, aside from a core of lectures, involves group tutorial, demonstration teaching. Each staff member carried a direct contact workload of about 100 hours. The Department felt that the progress and participation of the students were more than adequate and the student assessment of the system was generally complimentary. It should be noted that, with the staff available and the numbers of students, teaching groups of 17 are common and the system remains largely centralized. More decentralization and smaller teaching groups remain to be achieved.

Members of the Department also teach within other systems in Period II. Venereal disease, pulmonary and CNS infection, chemotherapy, surgical infection, exanthems of childhood, and infection in immuno-suppressed patients were covered in appropriate systems and involved between 2 and 8 hours contact time per man.

Period III teaching is more difficult to define, involvement being variable from hospital to hospital. Contact time varies from 0 to 20 hours for individual staff. The direct total contact teaching time for members of this Department in the undergraduate programme amounts to 1940 hours, averaging 120 hours per man.

(b) *In support of the teaching and patient care operations of the other clinical departments*, the service responsibility of the Department is very large and, in a teaching hospital, is clearly essential for the provision of exemplary medical care, which is the base on which the teaching of medical students and residents can be provided effectively.

At the administrative level, eight members of the Department function as chief of service in their particular hospital; six sit presently as members of the Medical Advisory Board; eight function as members of the Infection Committee; three as members of the Pharmacy and Therapeutics Committee; all fulfil one or more hospital administrative committee responsibilities.

The direct diagnostic responsibilities of the teaching hospital units involve a total technical staff of 156 and the assessment of about 0.5 million specimens per year. The basic responsibility for the service activity is a function of the individual hospital unit. The Department serves as a communication base and is clearly the focus for integration. Substantial development will take place here as "area service" becomes more clearly defined. At the present moment, integration of service activities involves the following: sharing of consulting activities as required; reference of difficult specimens or isolates; quality control for antibiotic sensitivity testing; quality control for antibiotic blood level assays; development and sharing of methodology; sharing of data and expertise in infection control. In respect to the last point, an Interhospital Infection Control Group has been formed under the aegis of this Department, containing not only medical microbiologists but infection control nurses and technologists, hospital administrators, and a range of physicians and nursing personnel. This group has been meeting monthly for nearly two years, with between 75 and 120 in attendance and clearly represents a significant integrative-educational activity.

(c) *Residency and Postgraduate Training*. The Department has been approved by the Royal College for a full four-year programme of microbiology training leading to Fellowship qualification. The Department is also approved for one year of residency training for candidates preparing for Clinical Pathology and for candidates in various medical and surgical specialties. During the past two years, the Department has supervised: 4 Residents in the Medical Microbiology programme; 8 Residents fulfilling the requirement of 6 months microbiology for qualification in Clinical Pathology; 2 Residents in Medicine; 2 Residents in Pediatrics. Each member of the Department attends two teaching rounds a week in their various hospitals. Infectious disease rounds at The Hospital for Sick Children, Toronto General Hospital and New Mount Sinai Hospital are attended weekly and involve direct responsibility.

Fifty-eight formal lecture presentations have been made by the staff at special rounds in the hospitals.

Thirty-six lectures have been given on a weekly basis, primarily for the residents in Microbiology and Clinical Pathology.

The Department mounts a one-day didactic programme in Infectious Disease in the Advanced Postgraduate Programme in Medicine and has contributed to four postgraduate courses in the past year.

Finally, the direct supervision of residents in the Department and the continuing contact with residents in all departments through the diagnostic function is an important teaching responsibility. The support of the residency programme clearly represents a major teaching load for the Department.

(*d*) *Research*. Major research organization is developing rapidly and will be potentiated by the addition of new staff. Despite a major teaching and service load, over forty publications have been produced in the last three years.

The Department does not have a formal M.Sc. or Ph.D. programme and clearly must make a contribution in this area.

Over the last two years three Ph.D. candidates and one M.Sc. candidate registered in the Graduate Department of the School of Hygiene have been directly supervised by members of this Department. It seems reasonable to consider that major emphasis may fall in the future on postgraduate programmes for both M.D. and Ph.D. qualified candidates. Four individuals in this category have been in residence during the past two years.

(*e*) *Programmes for other Health Science Students*. This Department does not, at the present time, have any direct responsibility in this area. It is true that, during the last year, through the agency of concurrent staff appointments in the School of Hygiene, staff members holding primary University appointments in this Department contributed 200 contact hours of teaching within the course for nurses, introductory immunology and the Diploma programme.

Neither this Department nor the Department in the School of Hygiene contributes to the undergraduate Dental Faculty programme. Assistance there is sorely needed.

Effective courses in Microbiology for Health Science students can be conceived as having three components: (*a*) a basic science component; (*b*) an applied science professional component, involving effective understanding of infection and immunity; (*c*) a component particularly oriented to the particular group concerned. Clearly, components (*a*) and (*b*) can be common to all Health Science students and it is in component (*b*) that the special expertise of this Department could apply. A clear definition of departmental responsibility would be essential if the discipline of our group were to be brought to bear on this problem.

RESEARCH

At the Toronto General Hospital and Banting Institute, Dr. N.A. Hinton and Dr. J.L. Penner are engaged in studies on urinary tract infection and the epidemiology of infections due to *Proteus* organisms. A new serotyping system has been described and the study expanded to involve *Pseudomonas* species with the active participation of Dr. P.J. Tuffnell. Epidemiological aspects of this work are progressing at Sunnybrook Hospital under the direction of Dr. I.B.R. Duncan. A major approach to gram-negative nosocomial disease is being developed by the above group.

At The Hospital for Sick Children, Dr. P.C. Fleming has just completed two major co-operative studies in the management of bacterial meningitis and osteomyelitis. Dr. Fleming is now actively proceeding with the assessment of antibiotic sensitivity testing systems and with detailed studies of the synergistic activity of sulfonamide-trimethoprim combinations and their use in a variety of infections.

Dr. R.M. Bannatyne is continuing his work in *Pseudomonas* burn infections and in the development of a programme concerned with neutrophil bactericidal activity. Dr. P.J. Middleton is continuing his programme of investigation concerning the application of immunofluorescence techniques in various aspects of clinical virology.

At Sunnybrook Hospital, Dr. I.B.R. Duncan is completing an investigation of the antibiotic sensitivity patterns of strains of *Pseudomonas*. A trial of the new antibiotic Cephalexin is being carried out and Dr. Duncan is completing his consideration of a long-term study of hospital-acquired staphylococcal disease. Dr. S. McDonald has

continued her study of infections in the hospital due to gram-negative bacteria with special reference to a new *Citrobacter* species. She has also just completed a detailed analysis of blood culture methods.

At the Women's College Hospital, Dr. Kathleen F. Givan is conducting a major analysis of the sensitivity of strains of *N. gonorrhoeae* to a range of antibiotics, correlated with studies of therapy in antibiotic-resistant gonorrhoea. A clinical trial with the new drug Spectinomycin has just been completed.

At the Wellesley Hospital, Dr. W.-D. Leers has continued his investigation of serologic tests in the laboratory diagnosis of viral hepatitis and has just completed a study of serum bactericidal activity in patients with malignant disease. Dr. A.E. Franklin has continued in collaborative study in the Rheumatic Diseases Unit concerned with serologic responses to viral infection in connective tissue diseases.

At the Toronto Western Hospital, Dr. H. Sepp has completed a study of disodium carbenicillin in the treatment of lower respiratory tract *Pseudomonas* infection.

At the New Mount Sinai Hospital, Dr. J.A. Smith has been actively investigating the development of a computerized system for infection surveillance and analysis. Studies of bacteriuria and infections in Obstetrics and Gynaecology are receiving special attention.

SCHOLARLY ADDRESSES

DR. I.B.R. DUNCAN presented a paper on "Recognition of Epidemic Strains of Staphylococci" to the Ontario Society of Medical Technologists Annual Meeting in London, Ontario in September 1971. Dr. Duncan also spoke on the following topics in the following Refresher Courses: "Antimicrobials in Gram-negative Infection," to the Advanced Graduate Course in Medicine; "The Use of Antibiotics and Recent Advances in Virus Diseases," to the Continuing Education Programme for Family Physicians; "Recent Advances in Control of Influenza," at the Annual Refresher Course of School of Hygiene.

DR. P.C. FLEMING spoke on "Recent Advances in the Control of Bacterial Infections" at the Fifteenth Annual Refresher Course of the School of Hygiene, in February 1972.

DR. A.E. FRANKLIN spoke to the Welland County Medical Society at Port Colborne, Ontario on 25 February 1972, his topic being "Australia Antigen."

DR. N.A. HINTON spoke on "The Changing Pattern of Bacterial Diseases of Man" at the Joint Meeting of Central and Western Ontario Branches of the Canadian Society of Microbiologists, held at the Ontario Department of Health, Public Health Laboratories, Islington, Ontario, on Saturday, 2 October 1971. Dr. Hinton also participated in a postgraduate clinic at Kirkland Lake and District Hospital, on 3 November 1971, speaking on "The Bacteriological Report - Normal Flora *vs.* Contaminant *vs.* Infecting Organism." On 12 November 1971, at the Course on Diseases of the External and Middle Ear - Pathologic Aspects, given by the Division of Postgraduate Medical Education and the departments of Otolaryngology and Pathology, Dr. Hinton spoke on the "Microbiologic Aspects of both the External Ear and Acute Inflammatory Diseases of Middle Ear and Mastoid." At the Forty-first Annual Meeting of the Royal College of Physicians and Surgeons of Canada, in January 1972, Dr. Hinton participated in the Pre-structured Session (Medicine), speaking on "Advances in the Microbiology of Urinary Tract Infections."

DR. W.-D. LEERS presented a paper on the "Sensitivity of Complement Fixation Test and Counter-Immunoelectrophoresis in detecting Hepatitis Associated Antigen" at the 39th Annual Meeting of the Canadian Public Health Association, December 1971, in Toronto.

DR. SHEILA McDONALD spoke on "Blood Cultures - A Comparison of Methods" at the Laboratory Section Meeting of the Canadian Public Health Association in December 1971; Dr. McDonald spoke also on "Hyatid Disease" in the Continuing Education Programme for Family Physicians.

DR. JOHN L. PENNER presented a paper on "The Serotyping of *Proteus rettgeri*"

at the Annual Meeting of the Canadian Society of Microbiologists, 1971. Dr. Penner also spoke to the Laboratory Section Meeting of the Canadian Public Health Association in December 1971 on "The Distribution of Serotypes of *Proteus rettgeri* in Infected Patients."

DR. HANS SEPP spoke on "Infection Control in Hospitals" to the participants in the In-Service Training Course for Public Health Inspectors, held in May 1972 at Ryerson Polytechnical Institute.

DR. P.G. TUFFNELL spoke on "Other Venereal Diseases" to the Meeting of Family Practitioners in September 1971; also, on the same topic to the Meeting of Medical Officers of Health in January 1972.

Three members of the Department, DRs. A.E. FRANKLIN, G.H. HAWKS, and P.G. TUFFNELL, participated in a Department of Ophthalmology lecture series in August and September 1971.

During the Refresher Course for Practising Pathologists held in February 1972, the Microbiology Session was chaired by Dr. I.B.R. Duncan; Dr. K.F. Givan reported on "The Sensitivity of Gonococcal Strains to various Antibiotics." Dr. Sheila McDonald's topic was "An Assessment of Methods of Blood Culture"; Dr. P.C. Fleming spoke on "What you always wanted to know about Trimethoprim." Dr. A.E. Franklin's topic was "Rubella - Diagnosis and Vaccination." Dr. J.A. Smith spoke on "Hospital Infection Control." At the General Panel Discussion the above Department members were joined by Drs. I.B.R. Duncan, R.M. Bannatyne, P.J. Middleton, and P.G. Tuffnell.

PUBLICATIONS

- Duncan, I.B.R. "The Practical Side of Infection Control" (*The Canadian Hospital*, vol. 48, no. 9, 1971, pp. 50-2)
- Givan, K.F. "Incidence of Hepatitis-Associated Antigen in a Toronto Hospital" (*CMAJ*, vol. 105, 1971, p. 602)
- Hinton, N.A. "The Isolation of Salmonellae from Frogs" (*Canadian Journal of Public Health*, vol. 63, 1972, p. 82)
- "Why Infection Control Programs Fail" (*The Canadian Hospital*, vol. 48, No. 9, 1971, p. 48)
- Hinton, N.A. *et al.* "Studies on lipopolysaccharides of *Proteus*" (*Canadian Journal of Microbiology*, vol. 17, 1971, p. 1385)
- Leers, W.-D. *et al.* "Occurrence of Australia Antigen in Patients with Leukemia in Canada" (*Lancet*, vol. 2, 14 August 1971, pp. 375-6)
- McDonald, S. (with Booth, E.V.) "A New Group of Enterobacteria, possibly a new *Citrobacter* sp." (*Journal of Medical Microbiology*, vol. 4, 1971, pp. 329-36)
- Penner, J.L. and Hinton, N.A. "The Distribution of Serotypes of *Proteus rettgeri* in Infected Patients" (*Canadian Journal of Public Health*, vol. 63, 1972, p. 76)

INSTITUTE OF MEDICAL SCIENCE

Under the direction of Professor J.C. Laidlaw

This was the fifth year of the Institute's existence, and the fourth year since its degree programmes were approved by the Appraisals Committee of the Ontario Council on Graduate Studies.

During the session 1971-2 there were 30 students in the Institute. Eight of these (M.T. Aye, B.A. Croy, M.O. El-Arini, N. Grosser, N. Iscove, H. Messner, M. Ogawa, and C. Park) were at the Princess Margaret Hospital, five (L. Berka, D. Butler, C. Grant, M. Kelly, and A. Wilensky) were at the Hospital for Sick Children, twelve (S. Botnick, J. Farkas, R. Hudson, S. Huterer, H. Kim, B. Lukie, P. Mann, H. Pang, C. Price, F. Smigura, W. Wassenaar, and A. Yates) were in the Clinical Science Division of the Medical Sciences Building, two (J. Ezer and G. Gray) were at the Toronto General Hospital, one (E. Tackaberry) at the Toronto Western Hospital, and

two (J. Warsh and J. Lexchin) were at the Clarke Institute of Psychiatry. Of the 30 students, 19 had the M.D. degree, 3 the D.V.M. degree, 6 had bachelor degrees, and 2 had master degrees. Twenty-one students were registered for the Ph.D. degree and nine for the M.Sc. degree. The student seminars were again ably organized by Dr. G. Steiner, and a seminar was given by each student during the year. The practice of assigning to each student a programme committee consisting of his or her supervisor and two other members of the University staff has been continued. Three Ph.D. students have graduated during this session: Dr. C. Park (supervisor, Dr. D. Bergsagel) whose thesis was entitled "Studies of the growth characteristics of myeloma in vitro" (external appraiser, Dr. M. Potter, National Institutes of Health, Bethesda); Dr. A. Yates (supervisor, Dr. J.R. Wherrett), whose thesis was entitled "Clinical studies on developing peripheral nerve" (external appraiser, Dr. R. Rossiter, University of Western Ontario); Dr. N. Iscove (supervisor, Dr. E. McCulloch), whose thesis was entitled "Cell culture studies of hemopoietic progenitor cells from mouse and man" (external appraiser, Dr. P. Carbone, National Institutes of Health, Bethesda); and Mrs. M. Kelly (supervisor, Dr. R. Hamilton) obtained the M.Sc. degree; her thesis was entitled "Sodium-potassium dependent adenosine triphosphatase in the intestine: relation to sodium losses in viral diarrhoea" (external appraiser, Dr. G. Sharpe, Harvard University). Six new students have been accepted for the 1972-3 session. Four of these hold the M.D. degree and two have a master degree.

During the year the following men became members of staff of the Institute: E. Milne (Radiology), R. Orange (Paediatrics), and M. Silverman (Medicine). This brings the number of staff to 73, of whom 48 are from clinical departments, 22 from basic science departments of the Faculty of Medicine, and 3 from the School of Hygiene.

During 1971-2 the Institute sponsored thirteen visiting lecturers. Dr. E.L. Becker from the University of Connecticut spoke on "The role of complement in disease" and "Enzymatic mechanisms in chemotaxis"; Dr. I.S. Edelman from the University of California spoke on "The mechanism of thyroid thermogenesis: role of active sodium transport" and "The mechanism of action of aldosterone"; Dr. E. Glaz from the University of Budapest spoke on "Dynamic changes in the level of renin activity, aldosterone and cortisol in patients with oligosymptomatic adrenocortical hyperfunction simulating essential hypertension"; Dr. P. Gold from McGill University spoke on "Immunologic studies in human cancer" and "Studies on carcinoembryonic antigen"; Dr. L. Harris from Harvard University spoke on "Hormonal control of the lower esophageal sphincter"; Dr. C.B. Mueller from McMaster University spoke on "The use of models in research and clinical problems" and "Cancer statistics, and rates and methods of dying in cancer patients"; Dr. J.M. McKenzie from McGill University spoke on "Mechanism of action of thyroid stimulators"; Dr. F. McMorris from Yale University spoke on "Differentiated function in neuroblastoma cell hybrids"; Dr. D. Sackett from McMaster University spoke on "Is health care researchable?"; Dr. A.N. Siakotos from the University of Indiana spoke on "Lipopigments in aging and disease" and "The analysis of complex lipid mixtures"; Dr. M.D. Siperstein from the University of Texas spoke on "The relation of diabetic vascular disease to hyperglycaemia" and "The control of cholesterol synthesis in normal and malignant tissues"; Dr. E.W. Taylor from the University of Chicago spoke on "The mechanism of actomyosin ATP and its relation to muscle contraction"; and Dr. P. Cole from Harvard University spoke on "The role of estrogens in carcinoma of the breast."

In an attempt to promote interest in medical research in undergraduate medical students, the Institute, through a special fund, provided three summer scholarships. The recipients of these scholarships were Messrs. R.D. Martin, W.S. So, and P. Trudel. These students will work for three months in the summer of 1972 under the supervision respectively of Drs. W. Zingg, C.H. Tator, and J.M. Fredrickson.

Dr. E.A. McCulloch continued to be a superb Graduate Secretary. The Executive Committee consisted of Drs. R. Volpe, G. Steiner, D. Fraser, H. Stancer, A. Sass-Kortsak, I. Broder, the Graduate Secretary, the Director, and two graduate students,

Drs. R. Hudson and N. Iscove. The Student Committee consisted of Drs. A. Becker, B.S.L. Kidd, A. Sass-Kortsak, G.G. Forstner, the Graduate Secretary, and the Director. I wish to express my gratitude to all of these men, as well as to all members of the Institute who served on the student programme committees.

In an effort to promote cohesion within the Institute, a two day meeting was held in October 1971 at the Briar's Inn, Jackson's Point. Approximately fifty staff and students attended. Guests included Dr. K. Charron, Deputy Minister of Health; Dr. J.R. Evans, Vice-President, Health Sciences, McMaster University; Dr. L. Butler, Associate Dean, Division IV, School of Graduate Studies, University of Toronto; Dr. A.L. Chute, Dean, Faculty of Medicine, University of Toronto; and Miss S. Dymond, Vice-Provost, Research Administration, University of Toronto. During the meeting four students of the Institute presented their work, and a panel discussion on "The future of medical research in Ontario and Canada" was held. A similar meeting is planned for this autumn.

As all members of the Institute have appointments in parent departments in the Faculty of Medicine or the School of Hygiene, the summary of their research publications, honours and scholarly addresses will be found in the reports of the Chairmen of these departments.

MEDICINE

Under the direction of Professor C.H. Hollenberg

GENERAL COMMENTS

During the past year, the Department of Medicine has continued to occupy a position of leadership within both the Faculty of Medicine and the Canadian academic medical community. The Department remains the bulwark of the Faculty's undergraduate teaching programme and the various postgraduate programmes sponsored by the Department are among the most effective and popular in the country. However, I hope that the members of this Department, rather than dwelling on past and present glories, are looking ahead to the problems and new challenges that await us in the immediate future.

It is now evident that constraints will be placed on the size of the total postgraduate programme of the Faculty of Medicine and as a result, the size of this Department's postgraduate programme is now under critical review by the Faculty's postgraduate committee. In the discussions that will ensue it will be particularly important for us to justify the numbers of trainees in our subspecialty programmes. Specialty committees and co-ordinators will have to produce solid evidence that the size of the various programmes is commensurate with provincial and national needs; this will be a most difficult task, given the current lack of information as to manpower requirements. Probably the best we can do is to apply "the law of the market place" and contract those programmes whose recent graduates have not been appropriately placed. Any overall reduction in the size of our total programme will inevitably require us to place more clinical responsibility in the hands of Internes and Junior Residents and thus we must maintain our efforts to strengthen the Clinical Clerkship programme so that our Internes are prepared during their Clerkship to assume greater patient responsibility. The current review of the Faculty's postgraduate programmes will very likely result in a gradual increase in the number of trainees in the Department of Family and Community Medicine. The Department of Medicine will therefore have to be prepared to receive on its wards more Family Practice residents and to organize ward teaching programmes that are appropriate to the ultimate goals of these trainees.

During the past year it has become evident that government is increasingly concerned about methods of remuneration of clinical teachers. The group practice and

ceiling arrangements that have evolved in the Department of Medicine assure University and government of academic and fiscal accountability and are basically sound and realistic. By the efforts of our own Department members, these arrangements are under continuous scrutiny and ambiguous situations are being identified and corrected. A Faculty committee, chaired by Dr. W. Horsey, has been studying this problem for many months and this committee will propose controls over remuneration that are much more rigorous than any that have heretofore been suggested. We have nothing to fear and a great deal to gain by an approach of this kind. A set of Faculty guidelines which lays out the conditions and controls of patterns of Faculty remuneration must enhance our ability to deal fairly and realistically with both government and our own Faculty members. Increasingly it appears that hospital-based group practices provide the teachers, the hospitals, the University, and government with an equitable, sensible, and accountable solution to this most difficult problem. However, these group practices will only succeed if they encompass most of the members of a hospital department, if they meet public, hospital, and University objectives and if the government leaves these group practices with the resources with which to operate. Any move by government to remove "third party" or "overage" funds will prevent necessary growth of and redistribution of money within group practices and will lead to their collapse. Government must be convinced that the size and character of a clinical department in a hospital must reflect the service and educational responsibilities of that department and not a bureaucratic judgment arrived at under some supposedly universally applicable formula.

Despite the evident successes of this Department in certain fields, there are other important areas in which we, as a Department, have made little impact as yet. While many of our individual members participate in a variety of programmes in continuing medical education, the Department has not evolved an overall approach to this particular problem. It is indeed surprising that a department as large and as strong as ours has not produced a pattern of leadership in the field of continuing medical education. Many medical educators are questioning the effectiveness of episodic visits of visiting lecturers to community hospitals, and of brief refresher courses aimed at large groups of practitioners. It would perhaps be more efficient if our teaching hospitals could offer practitioners individually designed programmes of in-hospital and ambulatory experience. These programmes could be carried out either by bringing practitioners into the teaching hospitals for appreciable periods of time or by introducing into community hospitals teaching programmes in selected disciplines on a continuing rather than an episodic basis.

Finally, the Department of Medicine must carefully consider its role in the rapidly developing programme of community clinics sponsored by the University of Toronto. While these clinics are designed primarily to provide models of "first-line" medical care, they will require on-the-spot consulting services if they are to be truly effective. It is thus conceivable and desirable that some of our effort in ambulatory care be directed towards the provision of specialty services in these clinics. This effort will require careful planning and considerable flexibility of approach.

RESEARCH

Allergy-Immunology

Dr. G. Blandford (TWH) : study of Sendai virus infection in rodents as a model system for the evaluation of the cellular and humoral events in a respiratory virus infection, and the isolation of specific anti-viral antibodies from serum and bronchial secretions. Dr. I. Broder (TWH) : mechanism of immunologic histamine release in the guinea pig lung; role of soluble antigen-antibody complexes in rheumatoid arthritis. Dr. S. Dubiski (TWH) : the phenotypic expression of immunoglobulin genes and their role in the initiation of antibody response. Dr. D. Osoba (PMH) : the function of A, B, and T mouse spleen cells, which interact during the production of an immune response to foreign erythrocytes; the association of Hl-A antigens with cancer (in association with

Mrs. Judy Falk) ; the development of a quantitative mixed-leukocyte culture technique of study cell-mediated immunity in cell culture. Dr. W. Pruzanski (WH) : clinical, immunological, immunochemical, and biophysical study of human M-components; immunochemical, physical, and biological properties of lysozyme; humoral immunity in malignant and non-malignant diseases in relationship to lysozyme, complement, transferrin, and immunoglobulins.

Cardiovascular

Dr. A.G. Adelman (TGH) : the development of a television/computer system for assessing left ventricular function. Dr. H.E. Aldridge (TGH) : a review of the saphenous vein aortocoronary bypass grafts at the Toronto General Hospital (with Drs. A.A. Trimble and L. Black). Dr. K.W.G. Brown (TGH) : arrhythmias in acute myocardial infarction. Dr. J.E. Morch (TGH) : tracer studies of myocardial lactate kinetics; myocardial blood flow at rest and after exercise, and the effect of practalol; natural history of ventricular septal defects (with Dr. E.J.G. Noble). Dr. E.J.G. Noble (TGH) : development of telephone transmission of pacemaker data; data storage questionnaire for computerization for pacemaker data. Dr. N.J. Petkovich (TWH) : correlations between scalar electrocardiograms and selective coronary angiograms in patients with chest pain; bundle of His recordings to correlate the levels of A-V block with pathogenesis and prognosis. Dr. E.D. Wigle (TGH) : a semi-automated television-computer system for the analysis of left ventricular function from cineangiograms; angiographic-pathological correlations of the mid-systolic click-late systolic murmur system. Dr. M.B. Waxman (TGH) : studies of the mechanism by which premature atrial beats disturb the basic rhythm of the heart; electrophysiologic studies in patients with Wolff-Parkinson-White Syndrome.

Clinical Pharmacology

Dr. J. Dornan (TWH) : a clinical trial of the anti-inflammatory/analgesic drug, Ibuprofen. Dr. W.A. Mahon (TGH) : tritiated gentamycin: clearance and metabolism in patients with normal and impaired renal function; development of a radio immunoassay for gentamycin; tritiated doxycycline: clearance in patients with renal failure. Dr. A. Knight (SBH) : clinical evaluation of a new oral bronchodilator hydroxyphenylorciiprenaline. Dr. T.T. Zsoter (TWH) : the effect of renal failure on the excretion and metabolism of antihypertensive drugs; the effect of salbutamol on the peripheral circulation and venous tone (with Dr. S. Epstein); a clinical trial of lidoflazine in the treatment of coronary artery disease (with Dr. D. Beanlands); the effect of hydrochlorothiazide and chlorthalidone on blood vessels.

Dermatology

Dr. H.J. Donsky (TGH) : studies of the use of complamin in vitiligo and griseofulvin in psoriasis. Dr. H.F. Haberman (TWH) : photosensitivity and other abnormalities associated with the porphyrias (with Dr. I.A. Menon); isolation and properties of subcellular components from melanoma cells. Dr. D.P. Varadi (WH) : enzyme induction in fibroblasts; vasoconstrictive effects of adrenal corticosteroids in Raynaud's phenomenon. Dr. C.W. Wyse (SBH) : a double-blind study of a new topical steroid fluocinonide acetanide acetate "Lidex" and its effect on psoriasis.

Endocrinology

Dr. C.H. Hollenberg (TGH) : studies on the hormonal regulation of adipocyte phosphodiesterase activity. Dr. D.W. Killinger (WH) : the biosynthesis of 11BHydroxyandrostenedione; the control of adrenal androgen production; the effect of anticonvulsant medication on androgen production. Dr. J.C. Laidlaw (TGH) : an investigation of the hypothesis that glucocorticoids and haperin inhibit aldosterone production by direct action on the adrenal cortex, using a cell suspension of normal adult rat adrenal cells (with Drs. C. Price and J.L. Ruse). Dr. R. Lee (SMH) : an analysis of clinical data obtained in the special insulin study to determine the antigenicity of sulphated

versus lente insulin (with Dr. J.A. Little); the effects of alcohol ingestion on the level of serum lipids. Dr. T. Murray (SMH): hormonal control of calcium haemostasis in man; radioimmunoassay for porcine calcium-binding protein; parathyroid function in clinical disorders of calcium metabolism. Dr. W. Singer (SMH): development of assays for plasma cortisol, human growth hormone, thyroid stimulating hormone, and serum digoxin. Dr. R. Volpé (WH): thyroid hormone metabolism; immune factors in thyroid disease. Dr. P.G. Walfish (NMSH): the effect of steroid therapy on plasma cortisol responses to ACTH, in insulin-induced hypoglycaemia in asthmatic patients; plasma cortisol and growth hormone responses in patients with anorexia nervosa and pituitary tumour pathology; development of a plasma progesterone assay by a competitive protein-binding radioassay technique; development of specific antisera for the measurement of plasma triiodothyronine and thyroxine; the effect of aminophylline on tolbutamide-induced effects on plasma, glucose, insulin, and growth hormone in normal and newly discovered diabetic patients; effect of augmented insulin test dose on plasma, glucose, cortisol, and growth hormone responses in grossly obese subjects; an evaluation of the Brush method for measuring plasma proinsulin levels in human subjects.

Gastroenterology

Dr. A. Bruce-Robertson (TGH): albumin synthesis during the postoperative period (with Dr. R.M. Stone); mechanisms controlling plasma protein synthesis in the rat (with Dr. K.N. Jeejeebhoy). Dr. N.E. Diamant (TWH): *in vitro* characteristics of dog esophageal striated muscle; enzyme histochemistry of dog, rabbit, cat, monkey, and rat esophageal striated muscle; myosin ATPase activity of dog, rabbit, and rat esophageal striated muscle; characterization of "Achalasia" in the dog; comparison of balloon kymography and open-tipped manometry during the mecholyl test in patients with Achalasia. Dr. S.V. Feinman (NMSH): immunoglobulins in bile in patients with gallstones; an assessment of the clinical, liver pathology, and immunological status of healthy carriers of the Australia antigen (with Drs. B. Berris, J. Sinclair, and O. Wrobel). Dr. M.M. Fisher (TGH): the hepatic metabolism of bile acids, with special reference to the sex differences involved; hepatic blood flow studies (with Drs. B. Langer, R.M. Stone, and S. Popovic). Dr. G.G. Forstner (TWH): the metabolism of intestinal glycoproteins; an evaluation of the Carcinoembryonic Antigen Test. Dr. K.N. Jeejeebhoy (TGH): factors controlling plasma protein synthesis in the rat; the effect of ethanol on plasma protein synthesis and its relationship to the nutritional state; the development of a hepatic cell culture system which synthesizes plasma proteins; the amino acid requirements and metabolism *in vivo* in the human (with Dr. G.H. Anderson and Dr. G.W. Chance). Dr. M.G. Sanders (TWH): the effects of Imuran in the treatment of Crohn's disease; factors relating to the incidence of pneumoperitoneum following fiberoptic gastroscopy.

Haematology and Oncology

Dr. R.E. Alison (PMH): co-ordinator of a co-operative study comparing regional versus local radiation for Hodgkin's disease, stages I and II; co-ordinator for the National Hodgkin's Disease Study of stages IIIb and IV, comparing the value of combination chemotherapy alone, versus combination chemotherapy followed by radiation treatment. Dr. A. Becker (PMH): a study of the integration of episomes into the chromosomal material of bacteria and bacterial viruses, as an approach to the study of cell differentiation and carcinogenesis. Dr. D.E. Bergsagel (PMH): factors controlling the growth of mouse and human plasma cell tumours in cell culture; the action of antineoplastic agents on normal hemopoietic and myeloma cells *in vivo* and *in vitro*. Dr. K.R. Butler (SMH): immunoglobulin abnormalities in patients with chronic lymphocytic leukaemia. Dr. D.H. Cowan (PMH): clinical management and the mechanism of remission in acute adult leukaemia; human bone marrow transplantation; cell spectroscopy: pulse height analysis of human erythrocytes and leukocytes (with Dr. R. Miller). Dr. J.H. Crookston (TGH): the enzymes responsible for synthesis

of the A₁ and A₂ antigens (with Mrs. M. Crookston and Dr. R. Schachter); the A, B, and Lewis substances in plasma (with Mrs. M. Crookston and Dr. J.R. Wherrett); the Chido blood group system (with Mrs. M. Crookston); the HL-A antibodies in pregnancy (with Mrs. M. Crookston and Mrs. J. Falk); studies on hereditary erythroblastic multinuclearity (with Mrs. M. Crookston, Dr. W.N. Valentine, and Dr. W.F. Rosse); a new variant of G6PD was discovered, characterized, and named "G6PD Toronto" (with Mrs. M. Crookston and Dr. A. Yoshida). Dr. J.E. Curtis (PMH): leukocyte transfusion programme in the management of patients with acute leukaemia. Dr. G.D. Hart (TEGH): paleoserology, continuing studies on the blood grouping of ancient skeletal material. Dr. M.B. Garvey (SMH): the effects of platelet suppression drugs on the patency of vessels following peripheral vascular surgery, and on patients with recent recurrent presumed cerebral emboli; effects of heparin on renal failure in chronic renal disease. Dr. J.H. Goldie (SMH): the activity of several new derivatives of methotrexate and aminopterin against methotrexate-sensitive and resistant lymphoma cells. Dr. J.W. Meakin (PMH): investigation of an androgen-dependent mammary tumour in the mouse, with the broad aim of determining the cellular basis of androgen dependence; human growth hormone levels in the plasma of patients with carcinoma of the endometrium (with Dr. B. Webster); effect of radiotherapy on the pituitary in Cushing's disease (with Dr. J. Simpson). Dr. E.A. McCulloch (PMH): studies of hemopoietic stem cells and their early differentiated descendants in mouse and man. In collaboration with Dr. J.E. Till, studies have continued on specific isoantisera affecting the growth of stem cells *in vivo*. A genetic approach designed to identify unknown specific genes affecting these stem cells, has been initiated; studies of clinical marrow transplantation (with Drs. D. Cowan, R. Phillips, and R. Miller); studies of remission induction in acute leukaemia (with Drs. D.H. Cowan, N.N. Iscove, H. Messner, and M.T. Aye). Dr. J. Senn (SBH): the application of bone marrow cell culture studies to the problems of acute leukaemia and other disorders (Dr. E.A. McCulloch and J.E. Till). Dr. D.M.C. Sutton (TWH): *in vitro* study of platelet function. Dr. J.G. Watt (TWH): the hyperviscosity syndrome in IgC myeloma (with Dr. W. Pruzanski).

Metabolism and Diabetes

Dr. G.L.A. From (TWH): radioimmunoassays in the evaluation of thyroid function and serum digoxin levels; abnormal insulin precursors characterized by Sephadex chromatography. Dr. N. Forbath (TGH): myocardial lactate kinetics in patients with angina; glucose and lactate turnover rate and lactate production from glucose in normal and diabetic patients. Dr. M.B. Goldstein (SMH): mechanisms of hydrogen ion secretion and sodium reabsorption in response to various physiological stimuli in patients with renal tubular acidosis. Dr. J.E. Harrison (TGH): investigations of metabolic bone disease using isotopic calcium absorption tests, calcium kinetic studies, and measurements of total bone calcium by *in vivo* neutron activation analysis; vitamin D-dependent calcium binding protein of small bowel mucosa. Dr. M.L. Halperin (SMH): the effects of insulin on the conversion of glucose to fat. Dr. J.A. Little (SMH): studies of patients with hyperlipoproteinaemia and their families, to determine the mode of inheritance of the various types. Dr. A. Rapoport (TWH): studies of calcium metabolism (with Dr. D.G. Oreopoulos and Dr. Husdan); the effect of angiotensin infusions on separate renal functions in dogs with chronic renal artery constriction of one kidney; and the effect of chronic unilateral renal artery constriction on blood pressure, separate renal function, and the development and function of collateral circulation in the dog (with Drs. S.M. Zweig, D.R. Wilson, and G.N. Ranking). Dr. D.A.K. Roncari (TWH): a study of the structure and regulation of the mammalian fatty acid synthetase complex and of the enzymes catalyzing glycerolipid biosynthesis. Dr. G. Steiner (TGH): the regulation of fatty acid synthesis in the liver; the role of the sympathetic nervous system in regulating brown adipose tissue metabolism; studies on the regulation of lipid transport in the circulation. Dr. G.S. Wong

(SMH) : a comparison of lente and sulfated insulin in the treatment of 80 diabetics. These two insulins are compared in terms of control of the disease, development of complications, and the development of circulating antibodies to insulin.

Neurology

Dr. R.M. Armstrong (TGH) : role of cell-mediated immunity in neurological disease: myasthenia gravis, polymiosites, and multiple sclerosis. Dr. P. Ashby (TWH) : the effect of vibration on the monosynaptic reflex and on the cortical evoked potential. Dr. H. Berry (SMH) : electrophysiologic studies of patients with Bell's palsy, traumatic shoulder neuritis, radial nerve palsy, and other forms of generalized neuropathy and entrapment neuritis. Dr. R.D.G. Blair (TWH) : serial changes in electroencephalographic and visual evoked responses during haemodialysis in patients with chronic renal failure; changes in sensory and motor conduction in peripheral nerves and the electromyograph in patients with chronic renal failure undergoing peritoneal dialysis (with Dr. D. Oreopoulos). Dr. O. Kofman (NMS) : an assessment of psychological, neurological, and hormonal correlates in patients before and during treatment with L-dopa (with Dr. G. Brown and Dr. E. Brown). Dr. R.G. Lee (TWH) : the development of computer techniques for the analysis of E.E.G. and E.M.G. data. Dr. J.T. Marotta (SMH) : the effect of L-dopa on mental alertness. Dr. J.R. Wherrett (TGH) : the chemistry of glycosphingolipids and their role in disease processes. Dr. J.G. Humphrey (TGH) : histochemical and electrophysiological studies of patients with: scapulo-peroneal muscle weakness and central core disease; corticosteroid and thyrotoxic myopathies; malignant hyperthermia; and acute cardiac rhabdomyolysis secondary to alcohol.

Nuclear Medicine

Dr. H.P. Higgins (SMH) : measuring the renal uptake of Chlormerodrin HG 1972 using the Gamma Camera; development of a simple method for measuring the uptake of 99m technetium by the thyroid gland (with Dr. D. Ball) ; determination of the normal range of radioactive iodine uptake by the thyroid gland at 24 hours, and a comparison with a similar group studied in 1959. In addition, urinary iodide levels were measured, and found to be approximately half that reported by centres in the United States. Dr. H. Meindok (TWH) : visualization of patency of arteries and arterial grafts with intravenous nuclide.

Renal Disease

Dr. G.A. deVeber (TWH) : renal osteodystrophy (with Drs. D. Oreopoulos, A. Rapoport, G. Lloyd, S. Rabinovich, and E. Meema), and the role of fluoride in this disorder; immunosuppressive drug therapy in glomerulonephritis (with Dr. A. Rapoport) ; role of heparin in acute or progressive proliferative glomerulonephritis (with Drs. M. Zweig and A. Rapoport) ; metabolism and excretion of labelled methyl-dopa in hypertensive patients with normal and impaired renal function (with Drs. T. Zsoter and G. Johnson) ; use of the leukocyte migration-inhibition technique to monitor rejection and immunologic status on renal allograft recipients (with Dr. R. Falk, Mrs. Judy Falk, Dr. D.R. Wilson, and Dr. R. Guttman). Dr. D.G. Oreopoulos (TWH) : effect of haemodialysis and peritoneal dialysis on the inhibitor of calcification of uremic plasma; on the use of calcitonin in the treatment of Paget's disease and patients with severe renal osteodystrophy (with Dr. A. Rapoport). Dr. C.C. Williams (WH) : radioimmunoassay of parathyroid hormone and calcitonin. Dr. D.R. Wilson (TGH) : the pathophysiology of obstructive nephropathy in the rat using micropuncture techniques; the pathogenesis of the calcium-containing renal calculi; the immunologic mechanisms involved with certain types of renal tubular acidosis (with Dr. R. Falk). Dr. M. Silverman (TGH) : transport receptors for monosaccharides in the dog kidney. Dr. S.M. Zweig (TWH) : the role of physical factors in intrarenal regulation of sodium excretion; conversion of acute oliguric to acute high-output renal failure with furosemide.

Respiratory

Dr. R. Bladek (TWH) : study of allergy to insects in man and the effects of therapy. Dr. F. Douglas (SMH) : application of foreign gas techniques to the measurement of pulmonary capillary blood flow; effect of controlled ventilation on lung mechanics and fluid balance. Dr. S.W. Epstein (TWH) : studies of the reactivity of the bronchi to various inhaled drugs in asthmatics; Dr. E.A. Phillipson (TGH) : role of the vagus nerve in the control of breathing.

Rheumatology

Dr. W.M. Franks (TWH) : the use of synovialysis to assess the value of this procedure in making a diagnosis of connective tissue disease, and to assess the incidence of pseudogout in the hospital population. Dr. D.A. Gordon (WH) : an evaluation of clinical, immunological and synovial fluid studies in patients with rheumatoid arthritis and related diseases (with Drs. I. Broder, W. Pruzanski, and M. Urowitz) ; a study of cell-mediated immunity in rheumatoid arthritis and related diseases (with Drs. D. Osoba and M. Urowitz). Dr. J.B. Houpt (NMS) : an evaluation of abnormalities of uric acid and tryptophan metabolism in patients with a variety of diseases. Dr. M.A. Ogryzlo (WH) : tryptophan metabolism in connective tissue diseases (with Dr. J.B. Houpt) ; uric acid and gouty nephropathy (with Drs. J.B. Houpt and W. Pruzanski) ; immunoglobulins in multiple myeloma, lymphomatous diseases, and the rheumatic diseases (with Drs. D. Gordon and W. Pruzanski). Dr. R.E. Renaud (TWH) : development of a suitable brace for the rehabilitation of patients with arthritis of the hip joint; the effect of short-wave diathermy on the local circulation. Dr. W.J. Reynolds (TWH) : study of synovitis of the hand, following patients with early disease and assessing better methods of measuring disease and deformities and the effects of treatment. Dr. H.A. Smythe (WH) : gout and uric acid metabolism. Sensitive assays for HGPRT'ase, APRT'ase and leukocyte glutaminase suggest that abnormalities of these enzyme systems do not play a role in primary gout as seen in adult populations; the cardiac lesion in ankylosing spondylitis (with Dr. A. Fan) ; the use of a troque measuring device to assess function in rheumatoid hands. Dr. M. Urowitz (WH) : a correlation of the presence of free DNA, and anti-DNA, complement and other immunological parameters in serum and synovial fluid in a prospective study of patients with systemic lupus erythematosus; a double-blind cross-over trial of azathioprine therapy in rheumatoid arthritis (with Dr. H. Smythe) ; a comparison of gold, chloroquine, and azathioprine in early rheumatoid arthritis; the role of soluble complexes in the pathogenesis of connective tissue diseases (with Dr. I. Broder).

HONOURS

DR. A. ANGEL, Ad Hoc Review Panel for scor Program, National Heart and Lung Institute.

DR. D.E. BERGSAGEL, Chairman, Medical Research Council, Clinical Investigation Grant Review Panel; Chairman, Royal College of Physicians and Surgeons of Canada, Committee on Medallist Awards.

DR. R. BLADEK, President, Ontario Thoracic Society.

DR. I. BRODER, Director, Gage Research Institute.

DR. K.W.G. BROWN, Governor, for Ontario, American College of Cardiology.

DR. S. DUBISKI, Vice-President, Canadian Society for Immunology.

DR. S.W. EPSTEIN, Chairman, Rehabilitation Committee, York Tb and R.D. Association.

DR. M.M. FISHER, Received the 1972 Medal in Medicine, Royal College of Physicians and Surgeons of Canada.

DR. C. GRAY, Member, Canadian Tuberculosis and Respiratory Disease Research Committee.

DR. M.L. HALPERIN, Associate Editor, Canadian Journal of Biochemistry.

DR. J.R. HILLIARD, Member, Nucleus Committee for Internal Medicine of the Royal College.

DR. C.H. HOLLENBERG, Sommer Memorial Lecturer, Portland, Oregon.

DR. D.W. KILLINGER, President, Toronto Society for Clinical Research.

DR. G.J. KUTAS, President, Haematology Section of OMA.

DR. J.C. LAIDLAW, Member, Governing Council, University of Toronto; Visiting Professor, Monash University; Visiting Professor, Edmonton.

DR. W.J. McILROY, Chairman, Medical Advisory Board of the Multiple Sclerosis Society of Canada.

DR. R.S. McPHERAN, President, Toronto Neurological Society and Neurological Section of the Academy of Medicine.

DR. J.E. MORCH, Chairman, Scientific Program, Canadian Cardiology Society Annual Meeting.

DR. J.S. OLIN, Chairman, Program Section of Internal Medicine, OMA.

DR. D. OSOBA, President, Ontario Antibody Club.

DR. P.S. ROSEN, First Vice-President, Canadian Rheumatism Association.

DR. G. STEINER, President, Clinical Research Society of Toronto.

DR. N. SWANSON, Chairman, Health Sciences Communications Association of North America.

DR. C.W. WYSE, Chairman, Dermatology Division of the Ontario Medical Association.

SCHOLARLY ADDRESSES

DR. A.G. ADELMAN, "A television/computer system for studying left ventricular function," Canadian Cardiovascular Society, Saskatoon, Sask.; "A television/computer system for studying left ventricular function," American Heart Association, Anaheim, California; "Acquisition and processing of cardiac catheterization data using a small computer," fall joint meeting of the American Federation of Information Processing Societies, Las Vegas, Nev.

DR. H.E. ALDRIDGE, "The prognosis in the severely dysfunctional ischemic left ventricle," the Canadian Saskatoon Cardiovascular Society, 24th Annual Meeting.

DR. A. ANGEL, "Lipolytic Effects of Insulin," Canadian Society for Clinical Investigation; "Synthesis of Cholesterol in Rat Epididymal Fat," Canadian Society for Clinical Investigation; "Regulation of Cholesterol Storage in White Adipose Tissue," American Society for Clinical Investigation; "Effects of Age, Diet, Intermittent Starvation and Obesity on Cholesterol Storage in White Adipose Tissue," the Endocrine Society, 53 Meeting Endocrine Society; "Cholesterol Synthesis in White Adipose Tissue," International Symposium Commemorating the 50th Anniversary for the Discovery of Insulin in Jerusalem; "Cholesterol Synthesis in White Adipose Tissue," American Heart Association Council on Atherosclerosis; "Effects of Insulin and Glucose on Initial Rates of Lipolysis and Intracellular (IC) FFA Levels in Isolated Adipocytes," Canadian Federation of Biological Societies; Proc. Canadian Federation Biological Societies, "Regulation of Cholesterol (C) Accumulation and Mobilization in White Adipose Tissue."

DR. R.M. ARMSTRONG, "Immunologic Aspects of Myasthenia Gravis," Neurologic Institute, Columbia Presbyterian Medical Centre, New York; "Current Research in Myasthenia Gravis," Division of Neurology, Montreal General Hospital, Montreal; "Immunologic Abnormalities of Thymic Lymphocytes in Myasthenia Gravis," American Academy of Neurology, Annual Meeting, St. Louis, Missouri.

DR. D.E. BERGSAGEL, "Whither Chemotherapy?" Third Clinical Cancer Research Conference, Geneva Park, Ontario; "Current Status of Cancer Chemotherapy," Phoenix Surgical Society, Arizona; "Advances in Cancer Chemotherapy," Royal College of Physicians and Surgeons of Canada Annual Meeting, Toronto; "Treatment of Plasma Cell Myeloma," American Cancer Society, New York; "Medical Oncology in Canada," Paris Cancer Conferences, Paris, France; "Plasma Cell Myeloma: Growth

rate and the effectiveness of Treatment," 14th International Congress of Hematology, São Paulo, Brazil.

DR. R. BLADEK, "The Changing Problems in Respiratory Diseases," Ontario Tuberculosis and Respiratory Diseases Association Annual Meetings, Oshawa and Peterborough.

DR. G. BLANDFORD, "The immune response in respiratory virus infections," Clinical Research Society, Toronto; "Antigen localization and the antibody response in a primary respiratory virus (Sendai) infection in mice," Society for General Microbiology, London, England; British Society for Immunology, London, England.

DR. I. BRODER, "Natural history of asthma and rhinitis in a total community," Mid-West Allergy Forum, Toronto; "Chemical Mediators of Atopic Disease," Royal College of Physicians and Surgeons, Toronto.

DR. W.T.W. CLARKE, "Chronic Renal Failure," Canadian Dietetic Association Therapeutic Workshop, Toronto; "A programme for the diabetic in office or clinic," 50th Anniversary of the Discovery of Insulin, Toronto; "Diabetes in the 50th year of Insulin," Canadian Diabetic Association, Guelph, Ontario; "Clinical Diagnosis and Management of Urinary Tract Infections," Royal College of Physicians and Surgeons of Canada Annual Meeting, Toronto.

DR. D.H. COWAN, Halifax Meeting of the American College of Physicians and the Royal College of Physicians and Surgeons of Canada; Royal College Meeting, Ottawa.

DR. J.H. CROOKSTON, "Delayed Hemolytic transfusion re-action, a new look at old blood groups," Pennsylvania Association of Blood Banks, Harrisburg, Pa.; "Hereditary anemia with multinuclear erythroblasts," IVth Annual Conference of the delineation of birth defects, Baltimore; "A short history of blood transfusion," Medical Historical Society of Western New York State, Buffalo.

DR. G.A. DEVEBER, "Effect of hemodialysis and peritoneal dialysis on the inhibitor of calcification of uremic plasma," American Society of Nephrology; "The assessment of cellular immunity to specific HL-A antigens in cadaveric renal allografts," RCPS(C) Annual Meeting, and also at Symposium on Cellular Aspects of Transplantation Immunity, Paris, France; "Metabolism and excretion of H³-reserpine in hypertensive patients with normal and impaired renal function," Canadian Society for Clinical Investigation; "Contrasting bone changes in patients on chronic hemodialysis and chronic peritoneal dialysis," Toronto Society for Clinical Investigation.

DR. M.M. FISHER, "Effect of ethionine of bile acid secretion in rats"; and "Sex difference in chenodeoxycholic acid metabolism in rats," Canadian Federation of Biological Societies, Toronto; "Drugs and the Liver, Clinical and Biochemical Aspects," Canadian Association of Pathologists, Saskatoon; "Effects of chenodeoxycholic acid on hepatic function and structure," American Society for Cell Biology, 11th Annual Meeting, New Orleans; "Further studies on the sex difference in CDCA metabolism in rats"; and "Sex differences in bile acid metabolism of human bile," American Association for the study of Liver Diseases, Chicago; "The ultrastructural characterization of 'Byler' bile," Canadian Society for Clinical Investigation, Toronto; "Bile Acids, Sex and the Liver," Royal College of Physicians and Surgeons of Canada, Toronto; "Effects of ethionine of amino acid concentrations in livers of female rats"; and "Effect of ethionine on bile acids of male rat bile," Federation of American Societies for Experimental Biology, Atlantic City; "Sex differences in bile acid composition of human bile," American Association for the Study of Liver Diseases, Dallas, Texas.

DR. N. FORBATH, "Tracer studies on lactate turnover rate and myocardial lactate kinetics during rest and arm exercise in patients with chest pain," Annual Meeting of Canadian Society for Clinical Investigation.

DR. P. FORBATH, International Conference of Paediatrics, Vienna; The Clinical Spectrum of mitral click syndrome, Tricity Meeting, Toronto. "Fascia lata aortic valve replacement."

DR. D.A. GORDON, "Radioactive Gold (¹⁹⁸Au) in the Treatment of Chronic Effusions of the Knee," The Interurban Arthritis Club, London, Ontario; VII European

Congress of Rheumatology, Brighton, England; Interim Scientific Session of the American Rheumatism Association, San Diego, California; New York Heart Association Symposium on Immune Complexes and Disease, New York City.

DR. C. GRAY, "Pulmonary Function Testing in the Community," Northumberland-Durham Medical Society, Cobourg; "Pulmonary Function Testing," Wellington County Academy of Medicine, Guelph; "Asthma – How to Live with it," Brant County Medical Society, Brantford; "Non-tuberculous Respiratory Diseases," Kingston Sanatorium Association, Kingston; "Pulmonary Function Testing," Guelph Medical Society, Guelph.

DR. M.L. HALPERIN, "Studies on the control of fatty acid synthesis in white adipose tissue, and reduction in adipocyte ATP levels by lipolytic agents: relation to intracellular FFA accumulation," Canadian Society for Clinical Investigation Conference, Ottawa; "Inhibition of L-Malate Transport by Methylmalonic Acid (MMA) in Rat Liver Mitochondria," Proceedings of the Canadian Federation of Biological Societies – 14th Annual Meeting, Toronto; "Sites of Insulin Action of Lipogenesis," Symposium on Insulin Action, Toronto; "The sites of Action of Insulin on the lipogenic Pathways in White Adipose Tissue," Lady Davis Institute for Medical Research, Montreal.

DR. C.H. HOLLENBERG, "Lipid Levels and Atherosclerosis," Ninth Annual Assembly of the College of Family Physicians of Canada; "Control of Adipocyte Development and Lipid Content," Symposium on Insulin Action, University of Toronto; Lakehead Summer School, Annual Meeting, Thunder Bay, Ontario; Sommer Memorial Lecture Series, Portland, Oregon; Guest speaker, McGill Faculty Retreat; Guest lecturer, Canadian Dermatological Association, Montreal.

DR. J.B. HOUP, "Systemic sclerosis and polymyositis," VII European Rheumatology Congress, Brighton, England; American Rheumatism Association Meeting, San Diego, California.

DR. J.G. HUMPHREY, "The treatment of inflammatory myopathies with azathioprine (Immuran)," Canadian Congress of Neurological Sciences, St. John's, Newfoundland; "Progressive Spinal Muscular Atrophy in young adult males," 4th International Congress in Electromyography, Brussels; "Cerebral Ischemia, Hypoxia and Cerebral Death," Medical Society, Thunder Bay, Ontario.

DR. K.N. JEEJEEBHOY, "Intravenous alimentation," Canadian Association of Hospital Pharmacists, Montreal and Halifax; "Postgastric syndrome," Cochrane Medical Association, Toronto; "Diets and malabsorption," Canadian Dietetic Association, Toronto; "Abdominal pain," St. Catherine Medical Association, Toronto.

DR. A. KNIGHT, "Autoimmune Diseases and environmental factors in Asthma," 2nd Pan-American Congress for Asthma, Mexico City.

DR. G.J. KUTAS, "Thrombocytophoresis – treatment for symptomatic thrombocytopenia," Clinical Research Society, Toronto.

DR. J.C. LAIDLAW, "The Renin-Angiotensin-Aldosterone-Sodium System in Hypertension," International Symposium, Mont Gabriel, P.Q.; "Diagnosis of primary aldosteronism and anti-aldosterone agents and their role in therapy," XXII Middle East Medical Assembly, Beirut.

DR. R.G. LEE, "Anti-viral chemotherapy in Jacob-Creutzfeld disease," Canadian Congress of Neurological Sciences, St. John's, Newfoundland; "Computer analysis of motor unit action potential in routine clinical electromyography," International Congress of Electromyography, Brussels; "Evolution of EEG and visual evoked response changes in Jacob-Creutzfeld Disease," Eastern Association of the Electroencephalographers, Mont Gabriel, Quebec.

DR. E.S. LILKER, "Respiratory Complications in Surgical Patients," Academy of Medicine, Toronto-Section of Surgery; "Ambulatory Portable Oxygen in COPD with Hypoxic Cor Pulmonale," Ontario Thoracic Society Annual Meeting, Scientific Session; "Tantalum Particle Clearance from the Airways, Gas exchange through the Bronchial Circulation," The Breath of Life Meeting, Canadian Thoracic Society, Toronto.

DR. E.A. McCULLOCH, "Colony formation by hemopoietic cells: Past and Future," International Society for Experimental Hematology, Davis, California; "Leukemia: Defective differentiation," National Institutes of Health, National Cancer Institute, Bethesda, Maryland; "Remission in acute myelogenous leukemia: II. Changes in cells forming colonies in culture (CFU-C)," Royal College of Physicians and Surgeons Annual Meeting, Toronto; "Leukemia considered as defective differentiation: Complementary *in vivo* and culture methods applied to the clinical problem," International Cancer Conference, Sydney, Australia.

DR. J.W. MEAKIN, "Effects of Chemotherapeutic Agents on Hormone-Dependent Neoplasms and Tissues," Third Clinical Cancer Research Conference, Geneva Park, Ontario.

DR. S. MINTZ, "The Redox state of the Alveolar Macrophage. Responses to Oxidant Air Pollutants," Canadian Thoracic Society, Toronto; "The Lungs are not Just for Breathing, Non-respiratory Functions of the Lung," Ontario Thoracic Society, Toronto.

DR. J.E. MORCH, "Tracer studies on lactate turnover rate and myocardial lactate kinetics during rest and arm exercise in patients with chest pain," Canadian Society for Clinical Investigation.

DR. J.W. NORRIS, "The Effect of Eschemia on Water and Electrolyte content of Cerebral Tissues *in vivo*," The American Society for Neurochemistry, Seattle, March 1972; "Acute Subdural haematoma of arterial origin," The 7th Canadian Neurology Congress, Banff; "Temporal Neuropathy from anti-coagulant therapy," 7th Canadian Neurology Congress, Banff.

DR. M.A. OGRYZLO, "Azathioprine, Controlled trial in rheumatoid arthritis," II Seapal Congress on Rheumatology, Auckland, N.Z.; "Nephropathy of Gout," Auckland, N.Z., Wellington, Sydney, Australia; "Monoclonal Gammopathy in Rheumatoid Arthritis," Auckland, Dunedin; "Pathogenesis of Rheumatoid Arthritis," Auckland, N.Z.; "Lysozyme in Rheumatoid Arthritis," Wellington, Australia; Konrad Hiller Lecture, Royal Australasian College of Physicians, on Wegener's Granulomatosis, Auckland; "Epidemiology of Rheumatic Diseases in North America," v Panamerican Congress on Rheumatic Diseases, Montevideo, Uruguay; "Audio-visual Aids in Teaching of Rheumatic Diseases," v Panamerican Congress on Rheumatic Diseases, Montevideo, Uruguay; "Serum and Synovial Fluid Proteins in Rheumatic Diseases," 4th Canadian Conference on Research in Rheumatic Diseases, Toronto; "Tryptophan Metabolism in Rheumatoid Arthritis and Scleroderma," 4th Canadian Conference on Research in Rheumatic Diseases, Toronto.

DR. D. OSOBA, "HL-A Genes and Cancer," Third Clinical Cancer Research Conference, Geneva Park, Lake Couchiching, Ontario; "Antibody Structure and Function and the Immune Response," Toronto Institute of Medical Technology, Toronto; "Immunosuppression," meeting of the British Columbia Society of Internal Medicine, Vancouver, B.C.

DR. E.A. PHILLIPSON, "Effect of differential blockade of the vagus nerves on ventilation and on the response to CO₂ in conscious dogs," Federation of American Societies for Experimental Biology, Atlantic City; "The role of the vagus nerves in the control of breathing in conscious dogs," Department of Medicine and Physiology, Mayo Clinic, Rochester, Minn.

DR. W. PRUZANSKI, "IgM/L Cryoglobulin with anti-i cold agglutinin activity," Royal College of Physicians & Surgeons of Canada Meeting, Ottawa; "Bacteriolytic and Bactericidal activity of sera and synovial fluids in rheumatoid arthritis," Annual Scientific Meeting, American Rheumatism Association, New York; "Bacteriolytic and Bactericidal activity of maternal and cord sera," 14th Annual Meeting, Canadian Federal Biol. Soc. Toronto; "Humoral Immunity in High-Lysozyme and normal (or low) Lysozyme Leukemias," 1st meeting, European Division, International Society of Hematology, Milan, Italy.

DR. J.G. RANKIN, "Alcoholism – a problem of personal and community health," New York Summer Institute on Alcohol Problems, State University of New York

College, Buffalo; "Epidemiology of Alcoholic Liver disease – insights and problems," Joint Royal College of Physicians and Surgeons of Canada – Canadian Society for Clinical Investigation – Gastroenterological Association of Canada Symposium "The alcoholic and liver disease."

DR. J.C. RICHARDSON, "Clinical Evaluation and Rehabilitation of Head Injuries," Annual Convention of Association of Workmen's Compensation Boards of Canada in Toronto.

DR. E.L. RITCEY, "Pulmonary Embolism – Recent Advances," Ontario Medical Association, Toronto; "Pulmonary Function Assessment," Institute of Inhalation Therapists, Toronto; "Respiratory Rehabilitation – Pulmonary Assessment," Rehabilitation Centre, Toronto; "Application and Interpretation of Pulmonary Function Tests," Ontario Tuberculosis and Respiratory Disease Association, Toronto.

DR. R.H. SHEPPARD, "Endocrinology and Nuclear Medicine – Advances in Scintillation Scanning," Peterborough, Medical Society.

DR. G. STEINER, "Increased lipogenesis by insulin independent of its action on glucose transport; and L-Thyroxine in the treatment of obesity with no increase in loss of lean body mass," Canadian Diabetes Association, Toronto; "Diabetes – 50 years after," Royal College of Physicians and Surgeons of Canada Meeting, Toronto; "The Interaction between serotonin and norepinephrine in the regulation of brown fat metabolism," IVth International Congress on Endocrinology, Washington, D.C.

DR. B.J. UNDERDOWN, "Resistance to proteolysis of IgA and IgE Myeloma Proteins," American Academy of Allergy, San Francisco, California.

DR. M.B. UROWITZ, "A prospective study of the Rheumatoid Biologically Active Factor – The Second Assessment," Society for Clinical Investigation and Royal College of Physicians and Surgeons Annual Meeting, Ottawa, Ontario; "Azathioprine Treatment of Rheumatoid Arthritis – A Double-Blind Crossover Study," European Congress of Rheumatology, Brighton, England and American Rheumatism Association, New York.

DR. R. VOLPE, "The effect of blood leukocytes from Patients with Hashimoto's Thyroiditis on human thyroid cells in monolayer cultures," Annual Meeting of the European Thyroid Association, Berne, Switzerland; "The Influence of Liver Damage in man on the distribution and disposal of thyroxine and triiodothyronine," Annual Meeting of the American Thyroid Association, Birmingham, Alabama; "The effect of blood leukocytes from patients with Hashimoto's Thyroiditis on human thyroid cells and tissue culture," Annual Meeting of the American Thyroid Association, Birmingham, Alabama; "Endocrine Disorders in Puberty," Ontario College of General Practice, Toronto; "Hypoglycaemia," Ontario College of General Practice, Toronto; "Graves' Disease – a Disease of Delayed Hypersensitivity?" Annual Thyroid Workshop, Wayne State University, Detroit, Michigan; "Studies of a case of galactorrhoea with pituitary tumour treated with L-Dopa," Annual Meeting of the Royal College of Physicians and Surgeons of Canada, Toronto; "The effect of alteration of thyroxine-binding globulin (TBG) capacity on the Dialyzable and absolute fractions of Triiodothyronine (T3)," Canadian Society for Clinical Investigation, Toronto; "The effect of triiodothyronine (T3) loading on Thyroxine (T4) and T3 dynamics in euthyroid persons," Canadian Society for Clinical Investigation, Toronto; "The pathogenesis of Graves' Disease," Symposium on Graves' Disease, Mayo Clinic, Rochester, Minnesota.

DR. P.G. WALFISH, "A Rapid screening test of adrenocortical function using a synthetic corticotropin," Annual Meeting Clinical Research Society of Toronto, Seaway Hotel; "Plasma Cortisol Responses in Steroid Treated Patients," Mid West Forum on Allergy Annual Meeting, Park Plaza Hotel, Toronto, and also at The Annual Meeting, Clinical Research Society of Toronto, Inn on the Park; "Normalized Plasma Cortisol and Growth Hormone Responses in Gross Obesity by Augmented Insulin Test, Scientific Program Annual Meeting of Canadian Diabetes Association, Toronto and the Annual Meeting Clinical Research Society, Toronto; "Plasma Glucose Insulin and Growth Hormone Responses to Aminophylline and Tolbutamide in Normal and Diabetic Subjects, Annual Meeting, Canadian Diabetes Association, Toronto.

DR. B.R. WEBSTER, "Isoelectric Focusing of human thyrotropin; identification of multiple components with diassociation of biological and immunological activities," Proceedings of the 2nd International Symposium on Protein and Polypeptide Hormone, Liège; "Isoelectric focusing of human TSH," Annual Meeting of the American Thyroid Association, Birmingham, Alabama.

DR. J.R. WHERRETT, "Chemical changes in sciatic nerve of rabbit during growth," Third international meeting of the International Society for Neurochemistry, Budapest; "Bis(monoacylglycerol) phosphate: a phospholipid specific to lysosomes in liver," Canadian Society for Clinical Investigation, Toronto; "A and B substances in glycosphingolipid fraction of human plasma," Canadian Society for Clinical Investigation, Toronto.

DR. E.D. WIGLE, "A television/computer system for studying left ventricular function," Canadian Cardiovascular Society, Saskatoon, Sask.; The above paper was also presented at the American Heart Association, Anaheim, California; "His Bundle electrogram in bundle-branch block," Royal College of Physicians and Surgeons of Canada, Toronto; "Wolff-Parkinson-White syndrome," Royal College of Physicians and Surgeons of Canada, Toronto.

DR. C.C. WILLIAMS, European Society for Clinical Investigation, 5th Annual Meeting, Scheveningen, The Netherlands.

DR. D.R. WILSON, "Renal Disease due to Analgesic Abuse," Royal College of Physicians and Surgeons of Canada, Toronto; "Renal Tubular Disorders," University Hospital, Edmonton.

DR. C.R. WOOLF, "Rehabilitation and Chronic Obstructive Lung Disease," Symposium on Pulmonary Rehabilitation, Toronto; "Management of Chronic Bronchitis and Emphysema," Toronto Institute of Medical Technology, Inhalation Therapy Division; "A rehabilitation program for improving exercise tolerance of patients with chronic lung disease," Ontario Thoracic Society, Toronto; "Pulmonary Function Tests, Their Use in Family Practice," Saskatchewan Chapter, College of Family Physicians of Canada, Lloydminster, Saskatchewan; "Chronic Bronchitis and Emphysema," Saskatchewan Chapter, College of Family Physicians of Canada, Lloydminster, Saskatchewan; "The Case of the Missing Breath," Saskatchewan Chapter, College of Family Physicians of Canada, Lloydminster, Saskatchewan; "The assessment of patients as to respiratory Risk before Surgery," Staff of Groote Schuur Hospital, Cape Town, South Africa.

STAFF

There were no deaths or retirements during the year. Dr. M.J. Ashley resigned. The following gives a picture of the staff position.

Leaves of Absence (Sabbatical Leaves)

Dr. K.J.R. Wightman, Dr. J.L. Silversides, Dr. J.R. Bingham.

Promotions

Professors: Dr. J. Crookston, Dr. A. Rapoport, Dr. R. Volpe.

Associate Professors: Dr. I. Broder, Dr. K.W.G. Brown, Dr. L.J. Cole, Dr. A.L. Hudson, Dr. K.N. Jeejeebhoy, Dr. M. Lenczner, Dr. I. Rother, Dr. J.G. Watt, Dr. J. Wherrett, Dr. D.R. Wilson.

Assistant Professors: Dr. A. Adelman, Dr. H.E. Aldridge, Dr. R.E. Alison, Dr. J.R. Brow, Dr. R.C. Charron, Dr. D.R. Crapper, Dr. G.M. Davies, Dr. H.J. Donsky, Dr. G. Emery, Dr. S.W. Epstein, Dr. S.V. Feinman, Dr. S. Fenton, Dr. P. Forbath, Dr. W.M. Franks, Dr. G.L.A. From, Dr. H.F. Haberman, Dr. R. Hasselback, Dr. M. Hill, Dr. A. Kenshole, Dr. R.G. Lee, Dr. A.H. Little, Dr. H. Meindok, Dr. S. Mintz, Dr. M.M. Nedilski, Dr. J.W. Norris, Dr. W.J. Reynolds, Dr. C.S. Saiphoo, Dr. D. Varadi, Dr. M.B. Waxman, Dr. B. Webster, Dr. C. Wyse, Dr. D.M. Young.

Associates: Dr. A. Briggs, Dr. R.M. Gladstone, Dr. R.S. Lester, Dr. F. Lipson, Dr. D. McGillivray, Dr. S. Murray, Dr. J. Stein, Dr. M. Weber.

New Appointments

Assistant Professors: Dr. G. Blandford, Dr. J.E. Curtis, Dr. A. Leznoff, Dr. M.V. O'Reilly, Dr. E.A. Phillipson, Dr. D.A.K. Roncari, Dr. M. Silverman.

Associates: Dr. P. Ashby, Dr. W.S.W. Chow, Dr. J. Dornan, Dr. U. Ehrig, Dr. M.B. Goldstein, Dr. C.I. Gryfe, Dr. R. Lee, Dr. N. Marcon, Dr. D.C. McGillivray, Dr. T.M. Murray, Dr. J.A. Smith, Dr. D.M.C. Sutton, Dr. C. Williams, Dr. G. Wong.

Clinical Teachers: Dr. L. Beattie, Dr. P.D. Clarke, Dr. J.W. Digby, Dr. G. Girdauskas, Dr. A.L. Haag, Dr. J.A. Harrigan, Dr. C.M. Leneck, Dr. C. Listgarten, Dr. D.L. Lloyd-Smith, Dr. J.K. McConnon, Dr. D.M. Mehta, Dr. F. Mills, Dr. L. Mitis, Dr. P.S.Y. Ng, Dr. H. Palter, Dr. T.W. Ptak, Dr. L. Silverberg, Dr. J. Topp.

PUBLICATIONS

- Aldridge, H.E. and Trimble, A.S. "Progression of Proximal Coronary Artery Lesions to Total Occlusion after Aortocoronary Saphenous Bypass Grafting" (*Journal of Thoracic and Cardiovascular Surgery*, vol. 62, 1971, pp. 7-11)
- Angel, A., Desai, K., and Halperin, M.L. "Free Fatty Acid and ATP Levels in Adipocytes during Lipolysis" (*Metabolism* vol. 20, 1971, p. 1228)
- "Intracellular Accumulation of Free Fatty Acids in Isolated White Adipose Cells" (*Journal of Lipid Research*, vol. 12, 1971, p. 104)
- "Reduction in Adipocyte ATP by Lypolytic Agents: Relation to Intracellular FFA Accumulations" (*ibid.*, vol. 12, 1971, p. 203)
- Becker, A. and Hurwitz, J. "Current Thoughts on the Replication of DNA" (*Progress in Nucleic Acid Research* vol. 11, 1971, p. 423)
- Blandford, G., Cureton, R.J.R., and Heath, R.B. "Studies of the Immune Response in Sendai Virus Infection of Mice" (*Journal of Medical Microbiology*, vol. 4, 1971, p. 351)
- Broder, I. and Taichman, N.S. "Mechanism of Histamine Release from Perfused Guinea Pig Lung by Soluble Immune Complexes. I. Complexes containing Rabbit Antibody" (*Immunology*, vol. 21, 1971, p. 193)
- Broder, I., Urowitz, M.B., and Gordon, D.A. "Appraisal of Rheumatoid Arthritis as an Immune Complex Disease" (*Medical Clinics of North America*, vol. 56, 1972, pp. 529-40)
- Brown, K.W.G. and MacMillan, R.L. "The Control of Congestive Heart Failure in Acute Myocardial Infarction"; in *The Art & Science of Cardiovascular Therapy*, chap. 36, New York: Grune & Stratton 1971
- Cantelon, J.F.D. "Diabetic Residents of Homes for the Aged - Observation for an Eleven Year Period" (*Journal of the American Geriatric Society*, vol. 20, 1972, pp. 17-21)
- Cowan, D.H. and Bergsagel, D.E. "Intermittent Treatment of Metastatic Malignant Melanoma with High Dose 5-(3,3 Dimethyl-1-triazeno) imidazole-4-carboxamide (NSC-45388)" (*Cancer Chemotherapy Report*, Part 1, vol. 55, 1971, pp. 175-81)
- Curtis, J.E., Hersh, E.M., Butler, W., and Rossen, R.D. "Antigen Dose in the Human Immune Response; Dose-Response Relationships in the Human Immune Response to Keyhole Limpet Hemocyanin" (*Journal of Laboratory and Clinical Medicine*, vol. 78, 1971, pp. 61, 69)
- Devenyi, P. and Wilson, M. "Barbiturate Abuse and Addiction and their Relationship to Alcohol and Alcoholism" (*Canadian Medical Association Journal*, vol. 104, 1971, pp. 215-18)
- "Abuse of Barbiturate in an Alcoholic Population" (*ibid.*, pp. 219-21)
- Devenyi, P. "Alcoholic Liver Disease" (*Canadian Family Physician*, vol. 17, 1971, pp. 34-6)
- "Medical Aspects of Drug Abuse" (*ibid.*, vol. 18, 1972, pp. 48-50)
- Donsky, H.J. "A Comparative Double-blind Randomized Clinical Study of a New Non-flurinated Topical Corticosteroid" (*Cutis*, vol. 9, 1972, p. 46)
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OBSTETRICS AND GYNAECOLOGY

Under the direction of Professor John L. Harkins

The past academic year has been busy and generally productive in the Department. A considerable amount of time was spent collating material and preparing reports for the various survey teams that visited us and also gathering material for the role study of the University of Toronto undertaken by Kates, Peat and Marwick at the direction of the government of the Province of Ontario.

The survey of the postgraduate training programme in our Department was undertaken by the Royal College of Physicians and Surgeons under the direction of Dr. R.A.H. Kinch. In general, Dr. Kinch's comments were laudatory with respect to our postgraduate programme and his suggestions for improvement were well received and are currently being implemented by modification of the postgraduate programme and by offering a wider diversification of experience than has been previously possible within the Department.

Coincident with the Royal College survey, the survey of undergraduate education undertaken by the LCME and ACOMC was carried out. In addition, the teaching hospitals of the Department were visited by survey teams of the Ontario College of Physicians and Surgeons who were studying the training programme offered to the junior rotating internes in Obstetrics and Gynaecology. This latter report pointed out the deficiencies which are existent in all academic centres in this province in providing suitable clinical experience for the junior internes in Obstetrics and Gynaecology. The problem of providing suitable clinical material for a heavy clerkship programme and the large number of rotating internes is general throughout the province. The numbers of public obstetrical patients are decreasing and to some extent in the teaching hospitals the obstetric volume is generally lower. This means that there is a doubled demand for clinical material and less clinical material of good teaching quality available.

The resolution of this problem has been discussed with chairmen of other provincial universities and it is hoped that a satisfactory solution will soon be reached and implemented – one that will improve the educational experience for rotating internes in obstetrics in the teaching hospitals.

The role study recommendations brought forth by Kates, Peat and Marwick have been forwarded to government and at present committees, on which representatives of our Department are sitting, are studying the effect of the recommendations of the role study on the Department of Obstetrics and Gynaecology. The overall recommendations have broad implications for the Department and we are now attempting to determine how the recommendations may be implemented and where they should be modified for the benefit of the medical school and the Department in general.

During the past year the Department, for the second time, taught Period II in the new curriculum and again it appears to have been a most successful endeavour. The difficulties encountered in the first year with patient flow and the demand for teachers has arisen but in general was solved satisfactorily. It would appear, as our experience grows with teaching in this method, that we may have to introduce some modifications

in the form of streaming of students which will permit us to bring the students into the Department in a less concentrated form so that the demands on the teaching faculty will not be so great at any one time and the patient flow can be worked out in such a way that adequate clinical experience can be gained and yet the pressure on the patients the four-week period has produced will be lessened. This year, as last year, we had to invite a fairly large number of voluntary teachers to come to our assistance in mounting the programme and again, I am indebted to these practitioners for their fine efforts on our behalf.

Period III appears to be gradually settling into a satisfactory academic experience. Some problems have arisen in certain hospitals where the competition for material between the clerk and the interne has arisen. The Department has studied this and is trying to bring about reforms that will improve both programmes. The increased use of teaching aids, filmstrips, movies, etc. which was started at the New Mount Sinai Hospital seems to be of value and the Department is going to expand its activities in this area for the clerkship training.

In the past year the Department has had several distinguished visitors, among them Professor Michel Bérard of the University of Montreal; Sir Lance Townsend of Melbourne, Australia; Dr. Clyde Randall, Vice-President of Health Sciences of the University of Buffalo and President of the American College of Obstetricians and Gynecologists; and Professor T.M. Roulston of the University of Manitoba.

Our research activities have increased considerably in the past year and we are indebted for new sources of funds to the Ontario Government Health Research Grants and the George Weston Research Fund, in addition to continuing support from other granting bodies.

I am indebted to the members of the staff of the Department, not only for their academic activities and their devotion to duty in patient care and research but, in addition, to their unswerving loyalty by serving on the many committees that have had to be established to deal with departmental problems resulting from the constantly changing environment of our specialty and the university.

RESEARCH

DR. P.F. BEIRNE: Research activities during the past year have continued in the area of ultra-sound as a diagnostic aid in obstetrics and gynaecology. A project to investigate the value of serial ultra-sound examinations in detection of intrauterine growth retardation has been initiated.

DR. S.L. COHEN: Progress has been made in devising assays for the "labile" estrogens of both pregnancy and non-pregnancy urine. For the former, gas chromatography has been used to identify the specific estrogens including the labile estrogen in the urine. For non-pregnant patients, urine has been studied using radioactive estrogen conjugates to check the amount of estrogen precipitate obtained with the ammonium sulphate procedure.

DR. T.A. DORAN: Multi-disciplinary approach to the study of amniotic fluid has been arranged. A research group known as the amniotic fluid study group with medical personnel from both The Hospital for Sick Children and the Toronto General Hospital has been formed. With the assistance of grants from the Provincial Health Research Fund, the programme is now well under way. The purpose of the programme is to study the cytologic biochemical and genetic aspects of amniotic fluids. In addition, an antenatal genetic diagnostic clinic has been established for diagnosis and treatment of pregnant women at risk for genetic disease.

The endometrial cytology study has continued. Some 1200 endometrial lavages have been done. The place of endometrial lavage is being evaluated and would seem to be of particular value in certain high risk groups.

DR. C.A. COWELL: Long-Term Study of the Impact of Therapeutic Abortion in the Adolescent Patient Under 18 Years of Age; The Use of Laminaria Tents; The Copper-T/I.U.D. Study; The Clinical Investigation of the Abnormalities of Pubertal

Growth and Development; Investigation of Various Mechanisms of Pregnancy Prevention in the Sexually-at-Risk Adolescent Teenager (i.e., Efficacy); Clinical Evaluation and Study of the Reproductive and Gynaecological Problems of the Handicapped Adolescent Girl.

DR. G. ENHORNING: The study of prophylaxis RDS in the newborn has continued. Rabbit foetuses delivered on the 27th and 28th day of gestation are not able to survive because they cannot expand their lungs. This is presumably due to lack of pulmonary surfactant, the synthesis of which does not start until the 27th day and not until the 29th day is surfactant available in adequate quantities. It has now been demonstrated that if rabbit foetuses on the 27th or 28th day of gestation are treated with a concentrate of pulmonary surfactant deposited in the trachea, or even in the pharynx, prior to the first breath, lung expansion and survival is improved. This result indicates the possibility of a prophylactic treatment of the respiratory distress syndrome in the newborn.

A new method for studying lecithin and spingomyelin (L:S ratio) in amniotic fluid is being developed, based on modifications of the method described by Gluck.

Quantitative and qualitative evaluation of spermatozoa motility is obtained by photographing a sperm sample. Differential exposure times using coloured film have been utilized. Based on this technique, the percentage of motile sperm and their velocity can be calculated. This method has been set up and will be used for evaluating the spermicidal effect of various agents. It can also be used for the evaluation of the ability of cervical mucus to resist penetration by spermatozoa.

DR. D.J. GARE: Continued clinical investigation of fetal heart patterns in labour to establish changes indicating fetal distress.

DR. A.H. GERULATH: Standardization of a procedure of radioimmunoassay of estradiol and estrone has been developed.

DR. J.W. GOODWIN: Further studies on aortic chemoreceptor regulation of circulation in the foetal lamb have taken place in conjunction with Dr. J.E. Milligan. Preliminary studies in systolic time intervals as an index of myocardial contractility in the foetal lamb have begun in conjunction with Drs. L.W. Organ and J.E. Milligan.

Development of a suction electrode for foetal scalp electrocardiography in conjunction with Mr. F.W. Unger is underway.

DR. G.M. LICKRISH: Clinical investigation of the natural history of dysplasia of the cervix has been established. The clinical evaluation of cryosurgery for pre-invasive cervical neoplasia is now underway.

DR. J.E. MILLIGAN: Studies of foetal physiology developed from the lamb are continuing in conjunction with Dr. J.W. Goodwin and Dr. L.W. Organ. Study of the pre-injection phase of the possible parameter in the diagnosis of foetal anoxia has been started. Studies of the control of renal circulation in the foetus have been undertaken. The control of the circulation in the foetus with special reference to the autonomic nervous system and chemoreceptor activity is being further elucidated. The effect of chemoreceptor stimulation of umbilical blood flow on cardiac output in the foetus is being studied. The effect of Halothane anaesthesia on anoxia and resuscitation of the newborn is being studied in conjunction with Dr. P. Goodhall of the Department of Anaesthesia.

DR. J.E. MORGAN: The studies of mechanisms of urethral closure is continuing. Further advances in surgical techniques for treatment of urinary stress incontinence are being studied. A combined urologic gynaecologic study of urinary tract infections in females is underway.

DR. F.R. PAPSIN: Continuing assessment of abnormal cytology and colposcopy in the human female.

DR. T.G. RYLEY: Continuing studies in the chromosome laboratory at the Wellesley Hospital have resulted in improved ability to grow foetal cells in the amniotic fluid and thus better establish abnormal cytogenetic patterns early in the second trimester of pregnancy.

DR. D.L. SHAUL: The study of the effect of progesterone on premenstrual tension

has been established in conjunction with Dr. Ladisich of the Department of Psychiatry.

DR. Y. SUZUKI: Studies on the estrogens in diabetic pregnancy: Labile estrogens such as 2-hydroxyestriol and 2-hydroxyestrone are destroyed during the course of extraction using ordinary procedures. In this study the suitable method to determine these labile estrogens is being investigated. Gas chromatography is used for qualification and quantification.

DR. S.M. TOBIN: Tissue cultures of chorionic tissue were undertaken to demonstrate the effects of the various carcinogenic drugs, viruses, and radiation on first trimester chorionic tissue. The studies are aimed at determining if specific agents will produce general changes or histologic changes similar to the hydatidiform mole or choriocarcinoma. Experimental studies of the armadillo, in an effort to reproduce hydatidiform mole or choriocarcinoma are continuing. Drugs, viruses, and radiation are being used. Other experiments related to transplantation of tissues in these animals are being initiated.

DR. G.I. URBACH: Research into trophoblastic immunology has been completed. A new programme of research into cancer immunology is being developed.

HONOURS

Douglas E. Cannell, Professor Emeritus in the Department, was awarded the Duncan Graham award by The Royal College of Physicians and Surgeons of Canada.

Dr. Anthony Cecutti has been nominated by the provincial government as one of its representatives on the President's Council of the University. Dr. Cecutti will have to resign his staff position at St. Michael's Hospital as clinical teacher to serve in this capacity.

Dr. William M. Paul has been elected President of the Society for Gynaecologic Investigation and also serves as the Chairman for the National Committee for Fertility Regulation.

Dr. J.L. Harkins has been appointed Chairman of the Examining Board in Obstetrics and Gynaecology for the Royal College of Physicians and Surgeons of Canada.

STAFF CHANGES

Dr. Richard Wilson has been appointed Consultant to the World Health Organization and will be on one year's leave of absence working for the World Health Organization in Geneva on problems relating to population control.

Dr. Rudi Borth has also been appointed a Consultant to the World Health Organization in population control and will be on leave of absence for two years to serve in this capacity with the World Health Organization.

Dr. Alan H. Gerulath has returned to the staff of St. Michael's Hospital as an Associate after spending two years in the study of malignant diseases in the N.D. Anderson Hospital in Houston, Texas. Dr. Gerulath will continue his research studies initiated while in the United States.

SCHOLARLY ADDRESSES

P.F. BEIRNE, "Diagnostic Ultra Sound in Obstetrics and Gynaecology," Refresher Course for Family Practitioners, Obs. & Gyn., U. of T., April 1972.

S.L. COHEN, "Estrogen Excretion by Diabetic Pregnant Patients," Toronto Western Hospital, November 1971; "Changing Patterns of Estrogen Excretion in the Pregnant Diabetic Patient," Academy of Medicine, February 1972; "Recent Findings on the Excretion of Estrogens During Pregnancy," Ann Arbor, Michigan, May 1972.

J.R. COLWILL, "Induction of Labour - 'To Rupture or Not to Rupture Membranes,'" Refresher Course for Family Practitioners, Obs. & Gyn., U. of T., April 1972.

C.A. COWELL, "The Common-Sense Gynaecology in the Adolescent Girl and

Child," Visiting Professor, Queen's University, Kingston, Ontario, December 1971; "Essentials of Paediatric and Adolescent Gynaecology," Refresher Course for Specialists, Obs. & Gyn., U. of T., March 1972; "Pregnancy in the Adolescent Girl – Therapeutic Abortion – The Alternative of Choice?" Annual Meeting of Royal College of Physicians and Surgeons of Canada, Toronto, January 1972; "Problems of Adolescent Maturation and Menstruation," Paediatric Refresher Course, Hospital for Sick Children, February 1972; "Problems of the Adolescent," Medical Staff of the Saskatoon City Hospital, Saskatoon, May 1972; "Impact of Pregnancy on the Adolescent," Dist. v Amer. College of Obs. and Gyn., McMaster University, June 1972.

T.A. DORAN, "Trophoblastic Disease," York County Hospital, January 1972; "Diagnosis of Genetic Disease Before Birth," Ontario Association for Mentally Retarded, Region 5, Owen Sound, April 1972; "Antenatal Diagnosis of Genetic Disease," Ontario Medical Association Annual Meeting, Toronto, May 1972.

A. EISEN, "Pitocin Associated Water Intoxication," Annual Meeting of Society of Obstetricians and Gynaecologists of Canada, Quebec City, June 1972.

G. ENHORNING, "Amniocentesis for Assessment of Fetal Maturity," Queen's University, April 1972; "Myocardial Function of the Fetus," University of Lund, Sweden, Faculty of Medicine, May 1972; "Prevention of RDS in the Newborn," Swedish Physiological Society, University of Lund, May 1972.

D.J. GARE, "Fetal Distress during Labour," Refresher Course for Specialists, Obs. & Gyn., U. of T., March 1972.

A.H. GERULATH, "The Primip Breech," Refresher Course for Family Practitioners, Obs. & Gyn., U. of T., April 1972.

J.W. GOODWIN, "Regionalization of Perinatal Care," Ontario Medical Association, May 1972.

W.J. HANNAH, "High Risk Pregnancy or Where do Dead Babies Come From?" "Family Planning and Contraception," 6th Scientific Assembly, Maritime Chapters, College of Family Physicians of Canada, October 1971; "Sexuality in the Post-menopausal Woman – A Discussion," Ontario Medical Association, Toronto, May 1972; "Abortions and the Hospital," Canadian Hospital Association Annual Conference, Winnipeg, Manitoba, May 1972.

J.L. HARKINS, "Creation of the Artificial Vagina," Refresher Course for Specialists, Obs. & Gyn., U. of T., 1972; "Amniotic Fluid Studies, Present Status-Future Potential," National Defence Medical Centre, Ottawa, May 1972; "Stress Incontinence of Urine. What? When? How?" Canadian Gynaecological Society, Murray Bay, P.Q., June 1972.

G.M. LICKRISH, "Outpatient Management of Pre-invasive Cervical Neoplasia," The American Society for Colposcopy and Colpomicroscopy, Los Angeles, October 1971; "Vaginal Cytology and Colposcopy," Refresher Course for Specialists, Obs. & Gyn., U. of T., March 1972; "Management of the Patient with Abnormal Smears," "Cryosurgery for Dysplasia and Carcinoma-in-Situ," The International Academy of Cytology, Chicago, April 1972; "Colposcopy and Outpatient Cryosurgery for Pre-Invasive Cervical Neoplasia," Society of Obs. & Gyn. of Canada, Quebec City, June 1972.

J.W. MILLIGAN, "Fetal Physiology," Guest Lecturer to Postgraduate Course of Obs. & Gyn. at the University of Western Ontario, January 1972.

J.E. MORGAN, "The Operative Approach to Stress Urinary Incontinence," Hamilton General Hospital, July 1971; "Urethrovesical Pressures in Voluntary Voiding, Stress Urinary Incontinence, and Detrusor Dyssynergia," University Hospital of Jacksonville, August 1971; "Stress Urinary Incontinence," Los Angeles County Hospital, March 1971; "Urologic Problems in Surgery and Gynaecology," 41st Annual Meeting, Royal College of Physicians and Surgeons of Canada, January 1972; "The Suprapubic Approach to Primary Stress Incontinence," Refresher Course for Specialists, Obs. & Gyn., U. of T., March 1972; "The Suprapubic Approach to Primary Stress in Urinary Incontinence," Society of Obstetricians & Gynaecologists of Canada, Quebec City, June 1972.

W.M. PAUL, "Obstetric Practice in Ontario," Dist. v, American College of Obs. & Gyn., October 1971.

T.G. RYLEY, "Laparoscopy in Gynaecology," Wellesley Hospital Clinical Day, May 1972.

B.W. THOMAS, "Venereal Disease," Welland County Medical Society General Practitioners Course, November 1971; "Identification of High Risk Pregnancies," Refresher Course for Specialists, Obs. & Gyn., U. of T., March 1972.

S.M. TOBIN, "Etiology of Trophoblastic Disease," Academy of Medicine, Toronto, February 1972.

PUBLICATIONS

Cohen, S.L. "The Excretion of 'Labile' Estrogens during Human Pregnancy. I. Normal Pregnancy; II. Diabetic Pregnancy" (*Acta Endocrinologica*, vol. 67, 1971, pp. 677-86; 687-97)

Colwill, J.R. *et al.* "Cerebral Glucose Utilization during Aerobic Metabolism in Fetal Sheep" (*Pediatric Research*, vol. 6, 1972, pp. 182-6)

——— "Comparison of Glucose, Fructose, and O₂ Uptakes by Fetuses of Fed and Starved Ewes" (*American Journal of Physiology*, vol. 221, July 1971, pp. 234-7)

——— "Insulin Response to Fructose and Glucose Infusions into the Sheep Fetus" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 136, Mar. 1971, pp. 972-5)

Cowell, C.A. *et al.* "The Irregularity of Early Menstrual Cycles" (*Journal of Obstetrics and Gynaecology, Brit. Commonwealth*, vol. 78, Dec. 1971, pp. 1093-5)

Enhorning, G. *et al.* "Expansion Patterns in the Premature Rabbit Lung after Tracheal Deposition of Surfactant" *Acta Pathologica microbiologica scandinavica*, Sect. A79, 1971, pp. 681-3)

——— "Experimental Respiratory Distress Induced by Paraquat" (*Journal of Pathology*, vol. 103, 1971, p. 239)

——— "Quantitative Determination of Pulmonary Surfactant with Pulsating Bubble" (*Scandinavian Journal of Clinical & Laboratory Investigation*, vol. 29, 1972, p. 45)

Gare, D.J. *et al.* "The Pregnant Diabetic" (*Modern Medicine of Canada*, vol. 26, 1971, pp. 37-40)

Goodwin, J.W. "Instrumentation for Fetal Electrocardiography and Intrauterine Pressure: A New Scalp Electrode and Radiotelemetry System" (*American Journal of Obstetrics & Gynecology*, vol. 112, 1972, pp. 351-7)

Hannah, W.M. "Sex Education: in which grade should sex education begin and how best can it be taught?" (*Medical Aspects of Human Sexuality*, 1971, pp. 37-8)

McCleary, P.H. "Sex Hormone Secretion of the Placenta Left *in situ* after Ovarian Pregnancy" (*American Journal of Obstetrics & Gynecology*, vol. 110, 1971, pp. 658-62)

Milligan, J.E. *et al.* "Control of Renal Circulation in the Fetus" (*American Journal of Obstetrics & Gynecology*, vol. 112, 1972, pp. 323-9)

——— "Control of the Circulation in the Fetus with Special Reference to the Autonomic Nervous System and Chemoreceptor Activity"; in *Physiological Biochemistry of the Fetus*, by Hodari & Mariona, pp. 204-12, 1972

Suzuki, Y. "Sex Difference in Hypertensive Action of Metopirone in Relation to its Plasma Levels in the Rat" (*Endocrinology*, vol. 90, 1972, pp. 924-30)

Whetham, J.C.G. *et al.* "Carcinoma of the Endometrium" (*American Journal of Obstetrics & Gynecology*, vol. 112, 1972, pp. 339-43)

OPHTHALMOLOGY

Under the direction of Professor Clement McCulloch

The Department's main contact with undergraduate medical students is in Period III. The programme has been gradually improving and this year it has been possible for the students to see a fair variety of diseases in the clinics and to gain some new experience and depth in the wards and, finally, to view a few ocular operations. Each of the undergraduate students has been able to rotate through the Eye Department of The Sick Children's Hospital and to see some pediatric ophthalmology. This practical experience has been supplemented with didactic sessions and slide tape presentations. The students appeared to have a reasonable insight into the field of ophthalmology at a level adequate for a general practitioner.

The graduate programme has been changing continually. This year there has been considerably more stress on projects, seminar sessions, and other types of in-course presentation by the students. The residents took the Resident In-Service testing programme, given by the American Academy of Ophthalmology, which has been found to be a good guide to the students' progress and also to correlate well with the results finally obtained at the Royal College of Physicians and Surgeons examinations. The Department has continued to give a full programme of lectures and laboratory and animal operating room sessions. This amounts to a considerable weight of formal instruction, on top of a large amount of participation by the students themselves.

The first year of the graduate programme is concentrated in the departmental laboratories. In addition to lectures and seminars, individual projects are pursued and at the end of the year the fellows must present a formal research paper embodying their project during the year. Besides that, the fellows have certain service commitments to the Eye Bank and to refraction clinics in the teaching hospitals, all of which prepares them for their service orientation in the following two years.

In the second and third years they are largely involved with these service commitments. The second-year students spend most of their time in the clinics and on the wards, working up and treating patients. The third-year residents have the responsibility for surgery in the Department. All residents rotate between the five teaching hospitals, which gives them a well-rounded experience, where they can gain an appreciation of the varied methods of handling cases in the different hospitals and a good depth of judgment. The final-year students also must present a paper covering their clinical research.

The following first-year fellows were supported through the Dean's Miscellaneous Fund: Dr. Gordon Barrie, Dr. Calvin W. Breslin, Dr. Brenda L. Gallie, Dr. Kweku N. Gharney, Dr. Robert L. Lewandowski, Dr. Roger R. O'Neill, Dr. Nancy I. Smith, Dr. Patricia K. Teal.

The second-year residents rotating through the teaching hospitals were: Dr. Kenneth Axmith, Dr. Jeffrey J. Hurwitz, Dr. Ilarion Melnyk, Dr. Richard D. Merritt, Dr. Charles J. Pavlin, Dr. Robert F. Stevenson, Dr. John C. Walters.

The final-year residents were: Dr. John H. Fowler, Dr. Ibrahim Kamel, Dr. Mark S. Mandelcorn, Dr. Malcolm J. McLean, Dr. Wesley A. Nash, Dr. Arporn Prompitak, Dr. David G. Stewart, Dr. Herbert Tanzer.

The Department participates with St. Joseph's Hospital, Toronto, and Hamilton General and St. Joseph's Hospital in Hamilton in their teaching programme. The second-year residents were as follows: Dr. John W. Waisberg, Dr. Jack S. Wise. The third-year residents were as follows: Dr. F. De Freitas, Dr. P. Migasena.

In each of these programmes, the students take their first year in basic science at the departmental laboratories in Toronto and then the second and third year in the local hospitals. They return for lectures and ward rounds during the course of their final two years.

We welcome Dr. William Dixon to the Department. He joins the staff at Sunnybrook Hospital; he has taken advanced work with Professor Barrie Jones at the Institute of Ophthalmology, London, England. His particular interest is external diseases and cornea. We also welcome Dr. Michael Easterbrook who joins the Department at the Toronto General Hospital. He has taken advanced work in uveitis and external diseases at the Francis Proctor Institute in San Francisco, California, and will strengthen the Department greatly in this field. Dr. J.R. Buncic has been working with Dr. William Hoyt in the field of Neuro-ophthalmology in San Francisco. He is in his second year of postgraduate work in that field and will join The Hospital for Sick Children.

Dr. R.W. Sheppard has been a fellow at the Sick Children's Hospital studying pediatric ophthalmology. He has been a great addition to the staff at that hospital, and has been supporting the graduate teaching programme particularly. He returns to the University of Cincinnati as Head of Pediatric Ophthalmology.

Dr. R.I. Noble has been studying plastic surgery under Dr. J.C. Hill at the Toronto

General Hospital. He comes from the University of Manitoba and will return to that Department to continue his work in his special field.

Dr. A.L. Maberley has spent the year as a fellow in retinal detachment under Dr. Michael Shea at St. Michael's Hospital. He will go to British Columbia after terminating this year.

Dr. Dig Sung Lee has had a year with Dr. P.K. Basu, studying corneal transplantation and graft rejection. He has also participated in the work of the Ophthalmic Pathology Laboratory.

Congratulations go to Drs. D.M. Anderson, T.P. Fejer, D.M. Jamieson, W.G. Macrae, A.L. Townsend, and M.W. Green who gained certification in the Royal College of Physicians and Surgeons examination, and to Dr. F. Simon who received Fellowship standing.

The major meetings held by the Department during the year were the Walter Wright Day on 4 February, the Annual Refresher Course on Cataract and Corneal Problems, 10 and 11 April; the Annual Research and Annual Clinical Day, 11 and 12 May.

The Fourteenth Walter Wright Lectureship was given by Dr. Goodwin Breinin from New York University Medical Center, who spoke on "Advances in structure and function of extraocular muscle." This year the lecture was given at the Academy of Medicine, jointly sponsored by the Department and the Academy. A full day of papers proceeded the lectureship. These were largely given by our own staff. Grand Ward Rounds were held on the subsequent day with Dr. Breinin as the Guest of Honour.

The guests of honour for the Annual Refresher Course were Dr. R. Troutman of New York, Dr. A. Bron of the Institute of Ophthalmology, London, England, and Dr. Claes Dohlman of the Retina Foundation in Boston. All three participated in various symposia, but also gave individual talks: Dr. Troutman on "Cataract extraction - explanation of techniques," "Techniques of penetrating keratoplasty," and "Grafting in complicated situations"; Dr. Bron on "My cataract extraction following keratoplasty," "Basic techniques and modifications," and "Therapeutic grafts"; Dr. Dohlman on "The tears in corneal disease" and "Alternatives to keratoplasty."

The subjects for the Annual Research Day on 11 May were chosen with particular emphasis on electronmicroscopy of the eye. Our guest of honour was Dr. Ben Fine from the Armed Forces Institute of Pathology, Washington, D.C., who gave two lectures on "Electronmicroscopy in ocular pathology." We were glad to have as a guest Dr. S. Zigman from Rochester, New York, who gave a paper on "Near ultraviolet effects on ocular tissues." In addition, the members of our staff contributed to a full day's programme. The first-year fellows presented papers and the winner was Dr. Patricia Teal for her paper entitled "Assessment of the normal disc." She was presented with the John Gaby Prize.

The guest of honour for the Annual Clinical Day on 12 May was Dr. Michel Mathieu from the University of Montreal. He gave papers on "Epi-bulbar tumours" and "Bullous keratopathies." The senior residents presented clinical papers and the Alumni Prize was won by Dr. H. Tanzer for his paper on "Vitreous hemorrhage with hemoglobinopathy." The final part of this day was devoted to a Grand Ward Round on cases presented by the staff.

The Ophthalmic Pathology Laboratory under the direction of Dr. W.S. Hunter has processed 385 specimens during the year. Dr. Vivien Boniuk has assisted with special studies and with the teaching of the residents. Miss Eileen Forster has provided technical help and Drs. Hunter, McCulloch, and Speakman attended the Canadian Ophthalmological Pathology Study Club in Ottawa in April and presented papers.

The Department wishes to thank the many individuals who have contributed to our activities during the year. These contributions have all been towards special research projects, remuneration of our staff, and the purchase of equipment.

The Selkirk Fund has continued to support the Department and the Alumni have given valuable aid to the residents who attend scientific meetings. Mrs. Lillian Kerbel has continued to support the Department in the memory of Manny B. Kerbel. Her

support has allowed the purchase of advanced ultrasound equipment. The Independent Order of Odd Fellows has continued to support Dr. Y. Matuk and our Section of Ophthalmic Biochemistry. We are also grateful for the support from the Lillian Mary Black estate. Finally, we greatly appreciate the efforts of the family of Mr. H.G. Stapells, who have set up the Ophthalmic Research Foundation and who have continued to support our postgraduate fellowship programme, and continued their interest in the activities of the Department.

The Chairman would like to thank both the academic and non-academic members of the Department for their unfailing support and continuing zeal throughout the year. We have significant strength and aid from our central laboratory and there is every indication that we can continue to be outstanding in the major fields of the specialty.

The Department is sad to lose the services of Dr. Vivien Boniuk who has been with us for two years. She has contributed tremendously to the Department, particularly in the field of teaching. She will join Dr. Miles A. Galin in New York City.

The Department is sorry to lose Dr. R.G.C. Kelly who is retiring from the University Department and as Chief of Ophthalmology at St. Michael's Hospital, but will continue in active practice. Dr. Kelly has been a strong supporter of St. Michael's Hospital and the University Department. He has moulded the Eye Department at St. Michael's Hospital into one of the strongest wings of the University Department. He has brought forward excellent men, so that Ophthalmology at St. Michael's will continue to advance. He has been loved by everyone who has come in contact with him and will be sorely missed.

RESEARCH

Under a Medical Research Council grant entitled "Corneal Research," Dr. P.K. Basu, with the assistance of Mr. F. Carré, Mr. D. Ordean, and Mrs. M. Skorupsky, continued studies on the immunological problems related to corneal grafting, using various kinds of *in vivo* and *in vitro* models. Dr. K.N. Gharvey and Dr. Basu have been conducting a study on the fate of platelets tagged with a radioisotope in ocular inflammation due to corneal graft response. Dr. G.J. Johnson and Dr. Basu, with the assistance of the tissue-typing laboratory at the Toronto Western Hospital, are continuing a tissue-typing study on the donors and recipients of corneal grafts. Dr. G.A. Thompson, Dr. Basu, and Dr. Gharvey are attempting to develop methods for the early diagnosis of corneal graft reaction in humans. Dr. Basu, with the assistance of Mrs. A. Wolf, Mrs. N. Bissoon, Mr. S. Hasany, and Mr. D. Ordean is attempting to develop methods for better preservation and sterilization of human donor eyes. Dr. D.S. Lee and Dr. Basu in a histopathological study on corneal grafts have been able to demonstrate the similarities between the allo- and xenogeneic grafts.

Mrs. A. Wolf is continuing her work as the executive secretary of the Eye Bank of Canada (Ontario Division). Since the beginning of the Eye Bank programme in 1955, 5735 eyes have been donated and 2839 eyes have been used for corneal grafting. The total number of people who have signed donor cards pledging their eyes is now about 60,000. The Eye Bank is a joint programme with the Canadian National Institute for the Blind, and is under the direction of Dr. G.A. Thompson. The Eye Bank laboratory, which is financed by the Ontario Hospital Services Commission, is under the supervision of Dr. P.K. Basu, who is assisted in the technical work by Mrs. Wolf, Mr. Ordean, and Mrs. Bissoon. Besides supplying the cornea, sclera, and vitreous, the Eye Bank also prepares suture materials from cadaver fascia lata. These sutures are being used by ophthalmic plastic surgeons in many centres in Canada and the U.S.A. Seton for glaucoma surgery have also been prepared.

With the assistance of a Medical Research Council grant namely "Keratoprosthesis," Dr. B. Zucker, with the assistance of Mr. F. Sanger, Mr. S. Niewojt, and Mrs. Bissoon, has completed a study on the artificial cornea.

With the assistance of a Medical Research Council grant entitled "Oculomycosis," Dr. J.J. Kazdan and Dr. P.K. Basu, with the assistance of Mr. S. Hasany, have been

studying the role of opportunistic and saprophytic fungi in the production of corneal lesions. They are also testing some of the newer antimycotic agents for the purpose of sterilizing eye bank eyes.

Dr. J.A. Parker, with the assistance of a Medical Research Council grant entitled "Analysis of the aspheric surface of the human lens," has been studying the optical properties of the lens. He is also testing retinal function at the Visual Investigation Unit at the Toronto General Hospital. He is involved too in visual testing by television contrast grating with the assistance of Dr. D.G. Stewart. Dr. I. Kamel and Dr. Parker are also studying erythropia in aphakia.

Assisted by a Medical Research Council grant, namely "The significance of the various wave forms in the electroretinogram," Dr. C. McCulloch, with the assistance of Drs. J.A. Parker and J.A. Orpin, has been continuing studies in the field of clinical electroretinography.

Dr. J.S. Speakman, with the assistance of Dr. M. Ghosh and Miss B. Stachowska, has been studying senile human lenses under a Medical Research Council grant entitled "A clinical and electron microscopic study of lens exfoliation."

Assisted by a Medical Research Council grant, namely "Filtration of aqueous humour with seton implantation," Dr. R.K. MacDonald has been developing setons for human glaucoma surgery.

In addition to the foregoing research works under formal grants, a number of projects have been undertaken by the various members of the Department in the departmental laboratory in various hospitals.

Dr. Y. Matuk continued the study of the effect of vitamin A on the incorporation of C^{14} glucosamine into the proteins of the retina. Dr. B.L. Gallie and Dr. Matuk are studying the effect of stress on the biosynthesis of glycoproteins by the retina in rats.

Dr. J.D. Morin, in collaboration with Dr. C. McCulloch and Dr. P.K. Teal, has made a study on the assessment of the normal disc. Dr. Morin and Dr. J.H. Fowler conducted a kinetic study of field defect in glaucoma. With Dr. W.A. Nash, Dr. Morin also did a study on Sturge-Weaver-Krabb syndrome and congenital glaucoma.

Dr. L.D.J. Chisholm and Dr. R.L. Lewandowski have studied the effect of brinolase on the extraction of the rabbit lens. Dr. Chisholm is also studying the problems of retinal detachment in children.

Dr. C.B. Mortimer, with the assistance of Dr. N.I. Smith, is studying fluorescein disc leakage in diabetic retinopathy. Dr. Mortimer and Dr. M.J. McLean are doing a pilot study on the treatment of disc neovascularization with Argon laser photocoagulation.

Dr. J.C. Hill is continuing his studies in the field of entropion, ectropion, and lacrimation. With Dr. R.I. Noble, Dr. Hill has done a double-blind study on safflower oil as a lubricant for artificial eyes.

Dr. M. Shea, with the assistance of Dr. R. O'Neill, has conducted research on the effect of bacterial collagenase in rabbit vitreous. Dr. A.L. Maberley and Dr. Shea have studied a two-band procedure in retinal detachment surgery. Dr. L. Lloyd has been reviewing the optic nerve gliomas in children at The Sick Children Hospital. Dr. J.S. Crawford has been doing research on cases of traumatic ptosis. With Dr. R. Sheppard, Dr. Crawford is attempting to improve the treatment of congenital cataracts. Dr. D.R. Smith is studying the effect of one muscle surgery on horizontal deviations. With the assistance of Dr. R.W. Sheppard and Miss Carol Panton, orthoptist, Dr. Smith has made a survey on the horizontal single muscle recession operation. Dr. M. Shusterman is continuing his studies on fluorescein angiography, diabetic retinopathy, retinal detachment, and laser photocoagulation. He is also studying catgut allergy and intra-ocular lens implants. Dr. W.S. Hunter completed a five-year review of surgical complications of cataract extraction as seen in the eye pathology laboratory specimens.

Dr. F. DeFreitas, in collaboration with Dr. J. Madronich, conducted a family study on ocular albinism. Drs. A. Promptak and G.J. Johnson studied the use of soft contact lenses in pathological and cosmetic cases. Dr. M.S. Mandelcorn, with the collaboration of Professor Theodor of York University, is working on a new approach

to the study of diseased maculas. Dr. H. Tanzer studied vitreous haemorrhage with haemoglobinopathy. Dr. W.S. Dixon has been interested in a study on the effect of topical interferon on inhibition of corneal epithelial lesions induced by vaccinia and herpes simplex viruses in rabbits.

HONOURS

DR. J.S. CRAWFORD, Honorary President, Canadian Orthoptics Society and Chairman of the Training and Accreditation Committee, American Orthoptic Council.

DR. R.G.C. KELLY, Vice-President, Pan American Association of Ophthalmology.

DR. C. McCULLOCH is Past President of the Canadian Ophthalmological Society. He is editor of the *Transactions of the American Ophthalmological Society*.

DR. HAROLD STEIN, Chairman, House of Delegates, American Association of Ophthalmology.

SCHOLARLY ADDRESSES

DR. J.S. CRAWFORD gave an address on "Management of under-corrections after frontalis sling operation," at the Ptosis Study Club, Las Vegas in September 1971. He also gave a paper for the Canadian Ophthalmological Society on "The repair of blepharoptosis with the modification of fasanella servat operation," at Harrison Hot Springs, April 1972.

DR. W.S. DIXON gave a paper on "Corneal fluorescein angiography," for the Royal Society of Medicine, London, England, December 1971.

DR. J.C. HILL gave a paper on "The treatment of enophthalmos," before the American Academy of Ophthalmology & Otolaryngology in Las Vegas, in September 1971.

DR. HANS HAUSLER gave a paper entitled, "Retinopathie bei zuckerkranken Versuchstieren," for the Society of the Rhine-Westphalian Ophthalmologists in Bonn, Germany, May 1972.

DR. W.S. HUNTER read a paper on "Mycosis fungoides," for the Canadian Eye Pathology Association, 6 May 1972. He presented two papers at a meeting of the Academy of Medicine, 4 February. They were: "Binkhurst intraocular acrylic lens," with Dr. P.L. Morton, and "Metastatic optic nerve head tumours," with B.E. Gallie and J.E. Graham.

DR. J.J. KAZDAN presented a paper on "Keratitis in children" for the Academy of Medicine, Toronto, September 1971.

DR. LOIS LLOYD presented a paper on "Primary leptomenigeal melanosis," before the American Neurophthalmic Pathology Group in Chicago, 25 February 1972.

DR. CLEMENT McCULLOCH gave the McPherson Memorial Lecture at the Annual Staff Meeting of the Memorial and McPherson Hospitals, 4 December 1971. His subject was "Techniques in microsurgery." He gave the Edwin Dunphy Lecture at the Massachusetts Eye and Ear Infirmary Alumni Association, Ophthalmological Session, Boston, 25 May 1972. On the following day, 26 May, he spoke on "Filtration and the filtering bleb," before the New England Ophthalmological Society in Boston. He was a guest speaker at a Symposium on Eye Surgery, The Edward S. Harkness Eye Institute, November 1971, New York. His talk was "When should we repair that leaking wound?"

DR. J.A. PARKER presented a paper on "Aspheric surfaces of human lenses," before the Optical Society of America, and a paper on "Aberration control in the human eye," before the Association for Research in Ophthalmology in April, Sarasota, Florida.

DR. MICHAEL SHEA gave a paper on "The management of complications in the release of subretinal fluid and retinal detachment surgery," before the American Society of Contemporary Ophthalmology in March in Hollywood, Florida. He also presented a paper, "Two band procedure in retinal detachment for surgery," before

the Irish Ophthalmological Society in Dublin, May 1972, and a paper on "Intravitreal electro-coagulation of blood vessels," before the Pan American Congress of Ophthalmology, Houston, Texas, April 1972.

DR. JOHN S. SPEAKMAN has been guest lecturer both at the Montreal Ophthalmological Society and at the University of Buffalo.

STAFF CHANGES

Retirement

Dr. R.G.C. Kelly, St. Michael's Hospital, 30 June 1972.

Resignation

Dr. Vivien Boniuk, Toronto General Hospital, 30 June 1972.

New Appointments

Dr. G.M. Cobb, Sunnybrook Hospital, September 1971; Dr. W.S. Dixon, Sunnybrook Hospital, January 1972; Dr. W.M. Easterbrook, Toronto General Hospital, January 1972.

PUBLICATIONS

- Anderson, D.M. "Ocular Siderosis: an Unsuspected Case" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 227)
- Anderson, M. and Morin, J. "Experimental Anterior Segment Necrosis and Rubeosis Iridis" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 196)
- Anderson, D.M., Morin, J.D., and Hunter, W.S. "Rubeosis Iridis" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 183)
- Basu, P.K. and Hurwitz, J.J. "Platelet Studies in the Corneal Xenograft Reaction and the Effect of Heparin" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, p. 205)
- Basu, P.K. and Hasany, S.M. "A Histochemical Study of Corneal Suture Reaction" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 328)
- Bell, A.G. and McCulloch, J.C. "Choroideremia and the Xg Locus: another look for linkage" (*Clinical Genetics*, vol. 2, 1971, p. 239)
- Buncic, J.R. and Morin, J.D. "After Image Scotometry in Macular Examination" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, p. 141)
- Burian, H.M. and Smith, D.R. "Comparative Measurement of Exodeviations at Twenty and One Hundred Feet" (*Transactions of the American Ophthalmological Society*, vol. 69, 1971, p. 188)
- Crawford, J.S., Merin, S. and Harwood-Nash, D.C. "The Use of Axial Tomography of the Optic Canals in Children" (*Transactions of the American Ophthalmological Society*, vol. 69, 1971, p. 279)
- De Freitas, F. and Morin, J.D. "The Changes in the Blood Supply of the Posterior Pole of Rabbits with Ocular Hypertension" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 139)
- Ghosh, M. and Speakman, J.S. "Anterior Central Opacities of the Capsule in Senile Lens Exfoliation" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 273)
- Hunter, W.S. "Office Management of the Partially Sighted Patient" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, p. 38)
- Hurwitz, J.J. and Basu, P.K. "Proc carbazine as an Immunosuppressive Agent in the Corneal Xenograft Reaction" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 320)
- "Platelet Studies in the Corneal Xenograft Reaction and the Effect of Heparin" (*ibid.*, vol. 7, 1972, p. 205)
- Johnson, G.J., Gillan, J.G. and Pearce, W.G. "Ocular Albinism in Newfoundland" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 237)
- Kirker, G.E.M. and McDonald, D.J. "Peripheral Retinal Degeneration in High Myopia" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 58)
- Mandelcorn, M.S. and Shea, M. "Primary Orbital Periopic Meningioma. A case report" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 293)
- Mandelcorn, M.S., Merin, S. and Cardarelli, J. "Goldenhar's Syndrome and Phocomelia" (*American Journal of Ophthalmology*, vol. 72, 1971, p. 618)
- Mandelcorn, M.S. and Crawford, J.S. "Feasibility of a Bank for Storage of Human Fascia Lata Sutures" (*Archives of Ophthalmology*, vol. 87, 1972, p. 535)
- Matuk, Y. "Studies on the Incorporation of Amino Acids by a Cell-free System obtained from Beef Retina" (*Canadian Journal of Biochemistry*, vol. 50, 1972, p. 581)

- McCulloch, J.C. "Immunosuppression and Keratoplasty" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 161)
- "Needle with Wire Loop for Drawing Sutures through Tissue" (*American Journal of Ophthalmology*, vol. 72, 1971, p. 1012)
- McCulloch, J.C., Orpin, J.A., Waisberg, J.W. and Parker, J.A. "Frequency Analysis of the Human Dark Adapted Electroretinogram" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, p. 189)
- Merin, S. and Crawford, J.S. "Hypoglycemia and Infantile Cataract" (*Archives of Ophthalmology*, vol. 86, 1971, p. 495)
- "The Etiology of Congenital Cataracts" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 178)
- "Assessment of Incomplete Congenital Cataract" (*ibid.*, vol. 7, 1972, p. 56)
- Merin, S., Harwood-Nash, D.C. and Crawford, J.S. "Axial Tomography of Optic Canals in Diagnosis of Children's Eye and Optic Nerve Defects" (*American Journal of Ophthalmology*, vol. 72, 1971, p. 1122)
- Merin, S., Crawford, J.S. and Cardarelli, J. "Hyperplastic Persistent Pupillary Membrane" (*American Journal of Ophthalmology*, vol. 72, 1971, p. 717)
- Parker, J.A. "Aspheric Optics of the Human Lens" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, p. 168)
- Pearce, W.G., Johnson, G.J., and Sanger, R. "Ocular Albinism and Xg" (*Lancet*, vol. 1, 1971, p. 1072)
- Pearce, W.G., Johnson, G.J., and Gillan, J.G. "Nystagmus in a Female Carrier of Ocular Albinism" (*Journal of Medical Genetics*, vol. 9, 1972, p. 126)
- Sibay, T.M., Hausler, H.R., and Hayes, J.A. "The Study and Effect of Streptozotocin (NSC-37917) rendered Diabetic Chinese Hamsters" (*Annals of Ophthalmology*, vol. 3, 1971, p. 596)
- Sibay, T.M., Elder, J.R. and Hausler, H.R. "Incidence of Diabetic Retinopathy among the Mentally ill" (*Canadian Journal of Ophthalmology*, vol. 6, 1971, p. 42)
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- Stein, H.A. and Slatt, B.J. *The Ophthalmic Assistant*, 2nd ed. St. Louis: C.V. Mosby Co. 1971
- Stevenson, R.F. and MacDonald, R.K. "Applanation Tonography: a Theoretical and Clinical Assessment" (*Canadian Journal of Ophthalmology*, vol. 7, 1972, pp. 29-37)

OTOLARYNGOLOGY

Under the direction of Professor D.P. Bryce

The Department of Otolaryngology has continued in its programme of postgraduate and undergraduate education without much change during the past year. Three courses were given in co-operation with the Division of Postgraduate Medical Education; the first in November on Temporal Bone Histopathology, a second in February on Rhinoplasty, and a third on Paediatric Broncho-esophagology in February. All of these courses were well attended and well received by the profession. Similar courses are planned for the coming year.

The development of the Temporal Bone Bank Activities and Educational Bank was continued with the help of the Atkinson Foundation grant. There was particular activity this year in the field of clinical and basic research into carcinoma of the larynx and hypopharynx. This activity has been reflected in the delivery of many related papers to a variety of specialty societies.

The Faculty in Otolaryngology has remained unchanged except for the addition to the staff of The Hospital for Sick Children of Dr. W.S. Crysedale and Dr. W.M. Hawke to the staff of Toronto General Hospital, both graduates of this training programme. Dr. Hawke is spending 50 per cent of his time in the activities of the Temporal Bone Laboratory.

Many travelling scientists visited the Department during the past year. In particular, the Barany Society held its first annual meeting ever held outside of Europe in Toronto, in recognition of the interest of this Department in vestibular physiology. The president of the Society, Professor Hans Engstrom, and many other scientists from

all parts of the world associated with this occasion, visited this Department and city. Professor Gosta Dohlman acted as Honorary Chairman of this Department.

RESEARCH

Research involving numerous challenging problems in Otolaryngology has continued to expand, both in depth and in breadth with international personnel representation from England, Ireland, Sweden, Norway, India, United States, West Germany, and various parts of Canada. In addition to the three research laboratories in the University Medical Sciences Building, facilities have also been established in the Banting Institute at 121 St. Joseph Street, and in associated hospitals (Toronto General, Sunnybrook, St. Michael's, Wellesley, Sick Children's, Mount Sinai, Toronto Western, Princess Margaret, and the Queen Elizabeth). As previously, considerable assistance has been provided by the Defence Research Board facilities at Downsview (Defence and Civil Institute of Environmental Medicine). Financial support has been provided by the Atkinson Charitable Foundation of Toronto, Defence Research Board of Canada, Deafness Research Foundation of New York City, Carey E. Fox Foundation, Ontario Department of Health, Ontario Cancer Treatment and Research Foundation, John F. Hartford Foundation of New York, Medical Research Council of Canada, National Cancer Institute, Department of National Health and Welfare, the Otolaryngology research funds provided by the staff of the associated hospitals, and grants from various pharmaceutical companies (CIBA, McNeill Laboratories, Sandoz, and Upjohn); also some assistance has been provided by joint research involving the Bureau of Medicine and Surgery, U.S. Navy, Pensacola, Florida.

As an indication of the continued expansion of research activity, 71 projects have been active during the academic year. Of these, 25 have involved problems associated with hearing, 31 have involved the non-auditory labyrinth, while 15 involved the nasopharynx and the larynx. Although many of these projects involve fundamental research, all such contributions to knowledge thereby obtained have definite practical clinical application. Furthermore, in co-operation with the Department of Physiology, three graduate students have been involved in such research, leading towards the M.Sc. and Ph.D. degrees.

In recognition of the Department's numerous research contributions dealing with the labyrinth, the Barany Society held its annual international meeting here in July 1971, thus marking the first meeting of this eminent organization away from Europe.

HONOURS

DR. H.O. BARBER, Examiner, American Board of Otolaryngology, Chicago. October 30–November 4, 1971.

PROFESSOR D.P. BRYCE, Award: "Laryngeal Library – An Educator's Viewpoint," Las Vegas, Nevada, A.A.O.O., September 1971; Visiting Professor, Mayo Clinic, Rochester, Minnesota, May 1972; Semon Lecturer in Otolaryngology, University of London, November, 1971; Honorary Fellowship, Royal College of Surgeons of Edinburgh, August, 1971.

DR. D.P. MITCHELL, appointed Programme Co-Chairman, Society of Paediatric Otolaryngologists.

SCHOLARLY ADDRESSES

DR. P.W. ALBERTI, Guest Lecturer at course in Human Communication, Faculty of Medicine, University of Michigan, Ann Arbor, Dec. 1971; Work Study Group on Problems in Cleft Palate – Group Leader in Audiology Section, American Speech and Hearing Association, University of Pittsburgh Medical School, Nov. 1971; Instruction Course, American Academy of Ophthalmology and Otolaryngology (AAOO), Las Vegas, Nevada, Sept. 1971; Guest Lecture, 20th Brazilian Annual Congress of Oto-

laryngology, September 1971, São Paulo, Brazil; Movie on "Impedance Audiometry," 3rd British Academic Conference of Otolaryngology, July 1971; Guest Lecture and instructor course on Middle Ear Surgery, Gummersbach, West Germany, July 1971; Audiovisual Systems, Annual Meeting of Royal College of Physicians and Surgeons of Canada, Toronto, January 1972; "Facial Paralysis in Children," Eastern Section of Triological Society, New York, Jan. 1972; Occupational Hearing Loss; Impedance Audiometry; Hearing Aids, Panpacific Surgical Association, Honolulu, Hawaii, Feb. 1972; "A Clinical Application of Impedance Audiometry," Impedance Symposium, Miami, April 1972; Guest Lecturer: "Occupational Hearing Loss; Facial Paralysis in Children; Unilateral Proptosis," Puget Sound Academy of Otolaryngology, Seattle, Wash., 19 and 20 May 1972; "A Longitudinal Study of Serous Otitis; The Recruitment Test and Stapedial Reflex Estimation; Normative Data," Mayo Clinic Symposium on Impedance Audiometry, Rochester, Minn., 8 and 9 June 1972.

DR. H.O. BARBER, "Positional Nystagmus in Normals," Barany Society Meeting, Medical Sciences Building, Toronto, Ontario; Course given on postural vertigo and positional nystagmus at the annual meeting of the A.A.O.O. in Las Vegas, Nevada, 20-24 September 1971; "Diagnosis and Treatment of Auditory and Vestibular Disorders after Head Injury," the Congress of Neurological Surgeons, Miami, Oct. 1971; ENG Course - Vestibular Involvement in Head and Neck Trauma, Presbyterian Hospital of Pacific Medical Centre, San Francisco, Cal., 7, 11, 12 December 1971; Film - Positional Nystagmus, Annual Meeting of Royal College of Surgeons, Toronto, 27 January 1972; Film - Dizziness, Medical Staff of the Branson Hospital, Toronto; Film - Positional Nystagmus, Otolaryngological Alumni Meeting, Women's College Hospital, 8 April 1972.

PROFESSOR D.P. BRYCE, (1) "Laryngotracheal Injury," (2) "Laryngeal Cancer," Albert Einstein College of Medicine of Yeshiva University, New York; (1) "Destructive Lesions of Maxillary Sinus," (2) "The Management of Laryngotracheal Injury as a result of intubation," (3) "Reconstructive Surgery Following Laryngectomy," (4) "The Use of Preoperative Irradiation in the Treatment of Cancer of the Larynx and Hypopharynx," Research Study Group, Los Angeles, Jan. 1972; "Pharyngo-laryngectomy With Multi-Stage Repair," III British Academy Conference in Otolaryngology, Edinburgh, Scotland, July 1971; "Unusual Problems in Nasal Sinus Disease," III British Academy Conference in Otolaryngology, Edinburgh, July 1971; "The Current Status of Surgery in the Treatment of Carcinoma of the Larynx," Assoc. of Head and Neck Oncologists of Great Britain, Liverpool, England; "Surgical Management of Laryngotracheal Injury," Semon Lecture, University of London, London, England, 1971; "Tracheal Resection," E.E.N.T. Society of British Columbia, Vancouver - University of British Columbia, March 1972; "Prognostic Significance of Vocal Cord Fixation in Carcinoma of the Larynx," Panpacific Surgical Association, Honolulu, February 1972; "Surgery in Nasal Allergy," Panpacific Surgical Association, Honolulu, Feb. 1972; "Tracheal and Laryngeal Trauma," Panpacific Surgical Association, Honolulu, Feb. 1972; "What's New in Otolaryngology," American College of Surgeons, Atlantic City, Oct. 1971.

DR. W. CRYSDALE, "The Status of Adenotonsillectomy," Ontario Medical Association, Toronto, 12 May 1972.

DR. V.S. DAYAL, "Embryology of the Ear - Temporal Bone Histological Study," Canadian Otolaryngological Society, Vancouver, B.C., 21 June 1972; "Otitis Externa," Ontario Temporal Bone Bank, Depts. of Otolaryngology and Pathology - Division of Postgraduate Medical Education, Toronto, 12 November 1971; "Embryology of the Temporal Bone," Ontario Temporal Bone Bank, Division of Postgraduate Medical Education, Depts. of Otolaryngology and Pathology, Toronto, 13 November 1971.

DR. J. FARKASHIDY, "Serous Otitis," Postgraduate Course (Diseases of the External and Middle Ear, Women's College Hospital, 12 Nov. 1971; "Chronic Otitis Media," Postgrad. Course (Diseases of External and Middle Ear), Women's College Hospital, 12 November 1971; "Surgical Anatomy of the Ear," Postgrad. Course (Diseases of External and Middle Ear), 13 November 1971; "Facial Nerve Tumours,"

Postgraduate Course (Diseases of the External and Middle Ear), Postgraduate Course, Women's College Hospital, 13 November 1971.

DR. B. FEARON, Guest Lecturer: University of Pennsylvania, School of Medicine, Philadelphia. Postgraduate Course in Laryngeal, Bronchial and Esophageal Disease in Infancy and Childhood, 4-6 May 1972; "Special Problems in Children," as part of a Symposium of Laryngeal Trauma. Sectional Meeting of the American College of Surgeons, Miami, Florida, 18 January 1972; Symposium on Laryngeal Trauma. "Laryngeal Trauma in Infants and Children," XIII Congress International Bronchoesophagological Society, Palais des Congress, Lyons, France, 10-13 July.

DR. J.M. FREDRICKSON, "One Stage Laryngeal Reconstruction to Overcome Pharyngotracheal Aspiration," AAOO, Las Vegas, Nevada, Sept. 1971; "Primate Vestibular Cortex," Alumni Meeting, Toronto, April 1972; "Vestibular Anatomy, Physiology and Control Therapy," Brain Research Conference, Colorado, 1971; "Revascularized Autogenous Rib Grafts to Reconstruct Mandibular Defects," Canadian Otolaryngological Society, Vancouver, June 1972; "Laryngoplasty for Laryngeal Reconstruction," Canadian Otolaryngological Society, Vancouver, June 1972; "Implantable Hearing Aid," Canadian Otolaryngological Society, Vancouver, June 1972; "Techniques of Microvascular Surgery in Head and Neck," American College of Surgeons, New Orleans, 1971; Movie: Forehead Flap for Intra-oral Reconstruction, AAOO, Plastic and Reconstructive Surgery, Las Vegas, Sept. 1971; "Forehead Flap for Intra-oral Reconstruction," Royal College of Physicians and Surgeons, January 1972; Canadian Otolaryngological Society, Vancouver, June 1972.

DR. W.H. JOHNSON, "Vestibular Problems in Space Flight," III British Academic Conference, Edinburgh, Scotland, July 1971; "E.N.T. Problems in the Pilot," Department of National Health and Welfare, in conjunction with the Defence and Civil Institute of Environmental Medicine, Ministry of Transport, 26 November 1971.

DR. V.G. LAWSON, "Salivary Gland Tumours - Investigation and Treatment," Ontario Medical Association Annual Meeting, Toronto, May 1972; "Use of Tragal Perichondrium and Cartilage in Tympanoplasty," U of T Temporal Bone Course, November 1971; "The Twisted Nose," University of Toronto Postgraduate Course - Rhinoplasty, Feb. 1972.

DR. J.A. McCLURE, "Adaptation and Habituation During Motion Sickness," Canadian Otolaryngological Society, Vancouver, B.C., June 1972; "An Analog Technique for Nystagmus Display," Barany Society, Toronto, August 1971; "Sweating During Motion Sickness," 4th Annual Winter Meeting, Canadian Physiological Society, St. Adele, Quebec, January 1972; "Effect of Environmental Temperature on Sweat Onset During Motion Sickness," Annual Meeting, Aerospace Medical Association, May 1972; "Medical Problems Encountered in Scuba Diving," Peel County Diving Club, Mississauga, Ontario, July 1971; "Recent Advances in Motion Sickness," School of Environmental Medicine, Canadian Forces, Toronto, March 1972; "Current Concepts in Vestibular Testing," Society of Audiology Technicians, Toronto, January 1972; "Sweating During Motion Sickness," University of Toronto, Toronto Vestibular Society, April 1972; "Motion Sickness," Defence Research Board Panel on Auditory and Vestibular Problems, CFB Toronto, December 1971.

DR. J.S. McGRAIL, "Treatment of Facial Trauma," Canadian Otological Society, Vancouver, B.C., 18 June 1972; "Investigations of Head and Neck Injuries in Automobile Crashes," Canada Safety Council, London, Ontario, 28 January 1972; "Laryngeal Reconstructive Surgery," Clinic Day, Wellesley Hospital, Toronto, 3 May 1972; "Laryngeal Trauma," R.A.M.C. Millbank, London, U.K., 25 July 1971; "Vocal Rehabilitation After Laryngectomy," III British Academic Conference in Otolaryngology, Edinburgh, Scotland, July 1971.

DR. D.P. MITCHELL, "Temporal Bone Fractures in Children," Canadian Otolaryngological Society, Vancouver, B.C., 22 June 1972; "The Deaf Child," The Lions Club of Toronto, 9 December 1971; "Results of Type II Tympanoplasty in Children," Val Gardena, Italy, March 1972.

DR. Y. MORISSETTE, "Optokinetic Nystagmus in Otolaryngology," Ontario

Academy of Medicine, Section of Ophthalmology, Toronto, 21 February 1972; "Retros cochlear Lesions," University of Montreal, 23 November 1971.

DR. R.H. NORTH, "The Lost Stapes Footplate," Ontario Medical Association, Section of Otolaryngology, 12 May 1972.

DR. G.P. ROSEN, "Assessment of Dizzy Patient," St. Joseph's Hospital Clinical Day, November 1971.

DR. D. SCHWARZ, "The Ascending Vestibular System," A.A.O.O., Las Vegas, Nevada, September 1971; "Structure and Connections of the Rhesus Vestibular Cortex," University of Toronto, Barany Society, August 1971.

STAFF CHANGES

The Faculty in Otolaryngology has remained unchanged except for two new appointments to the staff: Dr. W.S. Crysdale to The Hospital for Sick Children, and Dr. W.M. Hawke to Toronto General Hospital. Both are graduates of this training programme. Dr. Hawke will spend 50 per cent of his time in the activities of the Temporal Bone Laboratory.

PUBLICATIONS

- Alberti, P.W. "Facial Paralysis in Children, 150 Cases" (*The Laryngoscope*, vol. 6, June 1972, pp. 1013-20)
- Reviews, *Canadian Journal of Otolaryngology*, vol. 1, Feb. 1972, p. 72
- Barber, H.O. "The Hot Caloric Test as a Clinical Screening Device" (*Archives of Otolaryngology*, vol. 94, Oct. 1971, pp. 335-7)
- "Results of Ultrasound Therapy for Menière's Disease" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 6-8)
- "Vestibular Findings in Vertebro-Basilar Ischemia" (*Annals of Otology, Rhinology and Laryngology*, vol. 80, Dec. 1971, p. 805)
- Briant, T.D.R. "Carcinoma of the Nasal Premaxillary Complex" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 30-5)
- "Hyperbaric Perfusion of the Isolated Larynx: An Autoradiographic Study" (*Annals of Otology, Rhinology and Laryngology*, vol. 80, Oct. 1971, p. 5)
- Bryce, D.P. "Otolaryngological Training in Canada" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 146-9)
- "The Surgical Management of Laryngotracheal Injury" (*Journal of Laryngology and Otology*, vol. 86, June 1972, pp. 547-87)
- "What's New in Otorhinolaryngology" (*Surgery, Gynecology and Obstetrics*, vol. 134, Feb. 1972, pp. 271-4)
- Bryce, D.P. and Rider, W.D. "Preoperative Irradiation in the Treatment of Advanced Laryngeal Carcinoma" (*Laryngoscope*, vol. 81, 1971, pp. 1481-90)
- Bryce, D.P., Rider, W.D. *et al.* "The Management of Advanced Laryngeal Cancer" (*Journal of Laryngology and Otology*, vol. 86, Apr. 1972, pp. 309-15)
- Crysdale, W. "Ultrasonic Irradiation of Guinea Pig Cochlea" (*Annals of Otology, Rhinology and Laryngology*, vol. 71, Feb. 1972, pp. 87-98)
- Dayal, V.S. "Change in Type of Bekesy Audiogram in Acoustic Neuroma" (*Laryngoscope*, vol. 82, Jan. 1972, pp. 21-3)
- "Combined Effects of Noise and Kanamycin" (*Annals of Otology, Rhinology and Laryngology*, vol. 80, Dec. 1971, p. 887)
- "Elongated Styloid Process - An Unusual Report" (*Archives of Otolaryngology*, vol. 94, Aug. 1971, pp. 174-5)
- "Patterns of Pure Tone Loss in Presbycusis - A Sequential Study" (*Oto-Rhino-Laryngology Digest*, vol. 34, March 1972, p. 28) (abstract)
- "Pre-epiglottic Space - An Anatomic Study" (*Archives of Otolaryngology*, vol. 95, Feb. 1972, pp. 130-3)
- "Study of Crossed Olivocochlear Bundle on Adaptation of Auditory Action Potentials" (*Laryngoscope*, vol. 82, Apr. 1972, pp. 693-711)
- Farkashidy, J. *et al.* "The Ontario Temporal Bone Bank Program" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 90-4)
- "Tumours of the Facial Nerve within the Temporal Bone" (*ibid.*, pp. 75-82)
- Fearon, B. "The Management of Long Term Airway Problems in Infants and Children" (*Annals of Otology, Rhinology and Laryngology*, vol. 80, Oct. 1971, p. 669)
- Fredrickson, J.M. *Forehead Flap for Intra-Oral Reconstruction*. Film, Sept. 1971
- *Laryngoplasty for Laryngeal Reconstruction*. Film, 1972
- "Traumatic Ear Disorders including Fractures of the Temporal Bone"; in *Otolaryngology*, vol. 2, ch. 28. New York: Harper & Row 1972

- Fredrickson, J.M. (with Elcock, H.W.) "The Effect of Heparin on Thrombosis at Microvenous Anastomotic Sites" (*Archives of Otolaryngology*, vol. 95, Jan. 1972, pp. 68-71)
- Goodman, W.S. "The Treatment of Established Antro-Alveolar Fistulae" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 95-6)
- "Tympanoplasty: Areolar Tissue Graft" (*Annals of Otolaryngology, Rhinology and Laryngology*, vol. 81, Nov. 1971, pp. 1819-25)
- Johnson, W.H. "Motion Sickness: Autonomic Effects"; in *Handbook of Sensory Physiology*, vol. 6, ch. 7. New York: Springer-Verlag 1972
- "Some Otological Problems during Space Flight" (*Journal of Laryngology and Otolaryngology*, vol. 85, 1971, p. 1246)
- McClure, J.A. *Effect of Environmental Temperature on Sweat Onset during Motion Sickness*. Naval Aerospace Medical Institute NAMRL-1153, 1971
- *Forehead Sweating during Motion Sickness*. Naval Aerospace Medical Institute, NAMRL-1157, 1972
- "High-Speed Photographic Analysis of Whiplash in Monkeys" (*Journal of the Society of Motion Picture and Television Engineers*, vol. 81, Mar. 1972, pp. 187-90)
- "Response from Arousal and Thermal Sweat Areas during Motion Sickness" (*Aerospace Medicine*, vol. 43, Feb. 1972, pp. 176-9)
- *A Sweat Sensor for Qualitative Measurements*. Naval Aerospace Medical Institute, NAMRL-1148, 1971
- McGrail, J.S. "Suspension Microlaryngoscopy" (*Canadian Journal of Otolaryngology*, vol. 1, June 1972, pp. 129-34)
- "Tonsillectomy and Adenoidectomy - to do or not to do?" (*Canadian Family Physician*, vol. 18, Jan. 1972, pp. 53-4)
- Noyek, A.M. "Orbital Trauma"; in *Radiology of the Skull and Brain: The Skull*, vol. 1, bk. 2, pp. 541-58. St. Louis: C.V. Mosby 1971
- Olofsson, J. "Anaplastic Small Cell Carcinoma: Case Report" (*Annals of Otolaryngology, Rhinology and Laryngology*, vol. 81, Apr. 1972, pp. 284-7)
- "Anterior Commissure Carcinoma: Primary Treatment with Radiotherapy in 57 Patients" (*Archives of Otolaryngology*, vol. 95, Mar. 1972, pp. 230-9)
- "Radiotherapy vs. Conservative Surgery in the Treatment of Selected Supraglottic Carcinomas: A Retrospective Study" (*ibid.*, pp. 240-2)
- Schwarz, D. "Projection of Group 1 Muscle Afferents to the Postcentral Gyrus of the Rhesus Monkey" (*Pflügers Arch. Europ. Physiol.*, vol. 332, 1972, p.R86)
- "Rhesus Monkey Vestibular Cortex: A Bimodal Primary Projection Field" (*Science*, vol. 172, 1971, pp. 280-1)
- "Tactile Direction Sensitivity of Area 2 Oral Neurons in the Rhesus Monkey" (*Brain Research*, vol. 27, 1971, pp. 397-401)

PAEDIATRICS

Under the direction of Professor H.W. Bain

As will be seen below major advances were made in 1971 in providing health services on an ambulatory basis, not only in our hospital out-patient department, but in various parts of the community. This will be a continuing major objective in 1972. The Department of Paediatrics welcomes Dr. Aser Rothstein the new Director of Research, Dr. Johannes Huber who succeeds Dr. W. Donohue as Head of our Department of Pathology, and Dr. Robert Orange and his new Department of Immunology. Our major objectives for 1972, in addition to more clearly defining the role of The Hospital for Sick Children in Canada, will be to continue to develop the broad area of Perinatology and establish with the aid of government and other organizations a broadly based programme in Mental Retardation.

Ambulatory Division -- Dr. Donald Stewart

Each year sees a gratifying increase in utilization of our ambulatory facilities. Again, in 1971 there was an increase of 5 per cent with the total number of visits to the Medical Services being 85,587 as opposed to 81,079 in 1971.

During 1971 some of our new space became available and many of the specialty clinics were transferred to the new Elm Street wing, thereby cutting down on the crowding and congestion in our general ambulatory facility.

Our Drop-In Clinic which operates from 4:00 P.M. to 11:00 P.M. on weekdays and 9:00 A.M. to 11:00 P.M. on weekends has proven to be such a success that a similar service is now offered on weekdays from 9:00 A.M. until noon. This has enabled us to more closely honour the appointment system in our main out-patient clinic and an average of 20–25 patients is seen each morning in the new facility.

During 1971, a Comprehensive Care Clinic was established under the direction of Dr. Joan Whitfield, in an attempt to provide as closely as possible a private patient type of paediatric care in which the patient would be attended by one doctor. In addition, this clinic provides an opportunity for our students, internes, and residents to gain experience in the type of practice which many of them will be carrying on in the future.

The year has also seen our Mental Health Clinic blossom into full operation. This clinic, a part of General Medical Clinic, provides immediate access to psychiatric assistance provided by Dr. Saul Levine from the Department of Psychiatry. It allows us to assess severe behaviour disorders and identify specific psychoses at their onset rather than postpone intervention for several weeks.

Our Gynaecology Clinic under Dr. Carol Cowell's direction has already expanded to two clinics per week, reflecting the previous unmet needs in this field of adolescence. Pilot projects are underway in both Cardiology and Neurology in an attempt to introduce a system in which all of their patients, whether "private" or "clinic" are treated interchangeably. Certain of the geographic full-time specialists will have their permanent offices in this area.

In keeping with our overall objective of admitting to hospital only those patients who require admittance, the Haematology Service has established an out-patient treatment facility for blood transfusions, platelet transfusions, chemotherapy, intrathecal medications, and prophylactic treatment of haemophilia.

Because of the increasing number of patients using our Endocrinology and Nephrology clinics, it became necessary in 1971 to provide two such clinics weekly for each as compared with one each in 1970. Metabolic Clinic and Gastroenterology Clinic now require 5 clinics per week.

The acceptance of these facilities and services by the general public at a time when Medicare allows them to seek the doctor of their choice on a private basis speaks highly of the service being rendered by our staff in the Ambulatory facility.

Community Health – Dr. Ursula Anderson

After a slow but not unexpected beginning, our Community Clinics in the University Settlement Centre and especially in the Niagara "Trinity Bellwoods" area are beginning to expand. This applies particularly to the latter and the increased utilization coincided with a move to a new location just four blocks away from the original site. As mentioned in previous years, the main objective of our clinics, in addition to providing health care, is to gather knowledge regarding defects in our present health care delivery systems. Our hospital Department of Dentistry is now offering dental services on two half-days of each week at one of the clinics and a full-time nurse is working in each of the two centres. Health education is the keynote of the programmes and audio-visual programmes have been developed, stressing a variety of topics including vision, hearing, and nutrition for the parents.

Division of Cardiology – Dr. John Keith

Again, in 1971, this Division started a programme in the community. Two specially trained nurses aided by an electronic phono-cardioscan are conducting a screening programme of all the Grade IV pupils in the City of Toronto in collaboration with the City of Toronto Department of Health. It is hoped to identify any children with congenital or acquired heart disease who have so far escaped detection. In addition, the Division has further developed its interest in predictors of coronary heart disease in later life and a screening programme for serum lipid abnormalities has been introduced.

Division of Endocrinology – Dr. John Bailey

Dr. Donald Hill returned to The Hospital for Sick Children after three years at Johns Hopkins working with Dr. Donald Cheek in the study of cell growth. Dr. Hill is continuing his investigations of the causes of low birth weight, using a unique facility, a primate breeding colony at the University of Waterloo. These investigations of low birth weight offspring in monkeys will be of inestimable help in the prevention and management of this problem in newborn humans. This animal model will allow the study of the effects of undernutrition and even starvation on the developing foetus and the tiny infant and as such may help solve some of the major problems facing the world today.

In collaboration with many other divisions, Endocrinology plans to spearhead an overall attack on problems of Growth and Development.

Dr. Julio Martin returned from a year's sabbatical in Europe where he discovered a possible new hormone produced in the hypothalamic area of the brain which appears to stimulate insulin secretion. If this discovery is substantiated, it will have many important implications in our understanding of such conditions as obesity in children. Dr. David Parkinson returned from a year in Boston where he studied the adenylcyclase system which is important in understanding the action of many hormones.

Division of Gastroenterology – Dr. J.R. Hamilton

During 1971 a postgraduate course in Paediatric Gastroenterology at H.S.C. sponsored by the American Academy of Paediatrics attracted registrants from all regions of North America and from Italy and Puerto Rico.

Dr. Patrick Wei returned to Hong Kong for health reasons. His studies on new techniques for intravenous feeding in children led to major advances in treating a number of life-threatening intestinal disorders. In addition, his studies prompted us to undertake, in collaboration with the Toronto General Hospital, new approaches to this type of treatment.

Fascinating research studies of a specific viral gastroenteritis in piglets have led to a new understanding of gastroenteritis (diarrhoea), one of the major life-threatening diseases of young infants.

Dr. Sass-Kortsak, Research Professor of Paediatrics is co-ordinating a collaborative study of a new entity (α_1 anti-trypsin deficiency), one of the underlying causes of cirrhosis of the liver and certain lung diseases in children.

Division of Hematology – Dr. P.D. McClure

Reference has already been made to the establishment of patient treatment for many children with blood disorders. In addition, home treatment especially in haemophilia has been implemented, and 90 per cent of our haemophilia treatment programmes are now carried out without admission to hospital, using prophylactic injections of cryoprecipitate on a regular basis. Haemophiliac patients may now lead an essentially normal life. Many of the patients and their parents have been taught to administer the necessary intravenous injections.

Research continues on the cause and management of leukaemia and other malignancies in childhood.

Division of Infection – Dr. Crawford Anglin

During 1971, our study on meningitis in newborns continued, but it is too early to present results. During the year we have seen quite an increase in the number of admissions for whooping cough, stressing the fact that we must not relax our vigilance and become sloppy in our immunization programmes. Various treatment regimens are being studied and it is gratifying that no deaths occurred as a result of the disease. A special unit was opened under the direction of Dr. William Balfe to investigate and treat fluid and biochemical upsets in severe infectious diarrhoeal disease in children and in collaboration with the Division of Gastroenterology the total management of these patients is being studied.

Division of Nephrology – Dr. C.P. Rance

This was the fifth year of operation of our Dialysis Unit and it appears that we will have at least 4–6 new patients a year starting on dialysis as the result of chronic kidney failure and that a kidney for transplant may be obtained after an average period of ten months on dialysis. Under Dr. Arbus's direction, we have changed from peritoneal dialysis to haemodialysis and our effort is in the direction of returning these children to as normal a life as possible. Much of the success of the rehabilitation programme is due to Mrs. Matthews, our Social Worker, working in collaboration with the Department of Psychiatry, the school teachers, and the staff of the Unit. Dialysis has proved invaluable in the management of certain poisons. Studies are underway in babies severely dehydrated from vomiting and diarrhoea who may have convulsions and brain damage caused by high concentration of salt in their blood.

Division of Adolescent Medicine – Dr. Martin Wolfish

The Teen Clinic continues to grow, reflecting acceptance of our hospital by youth. This has necessitated increasing our facilities from 2½ to 18 hours weekly. Clinics are now held each morning and one afternoon each week. Seven of our staff paediatricians serve the clinic because of their interest in the problems of adolescence. One full time and two part-time fellows in addition to 12 paediatric residents also gain valuable experience in this Division each year.

Chest Division (Dr. J.A.P. Turner, Dr. H. Levison, Dr. D. Crozier)

The lungs are involved in disorders of many other systems and organs including cystic fibrosis, accidents and injuries, skeletal disorders such as scoliosis, to say nothing of heart disease, breathing disorders of the newborn, asthma, and many others. Consequently, we have continued to place a great deal of emphasis on research in this area. This research is under the direction of Dr. Henry Levison. With the collaboration of Dr. Crozier who heads up our Cystic Fibrosis Clinic, a controlled study of mist-tent therapy in patients with cystic fibrosis has recently been concluded and the results will soon be forthcoming.

In conjunction with Dr. Collins-Williams, Chief of our Division of Allergy, an objective pulmonary function analysis of asthmatic children treated with a new drug Intal has been concluded. This drug has been shown to be of significant benefit to some asthmatic children.

Several members of this Division make daily rounds in our Intensive Care Unit with Dr. Alan Conn, Chief of I.C.U., the Chief Residents and others, advising on the management of complicated respiratory problems. This service has been of inestimable benefit in the management of the many complex problems seen in this unit.

Division of Neurology – Dr. J.S. Prichard

Under the direction of J.A. Lowden who heads up the research arm of this Division, a mass screening programme for the detection of a serious neurological disorder, Tay Sachs Disease, was instituted in 1971. By detecting carriers, it will become possible, by amniocentesis, to determine whether the unborn child is afflicted with this fatal condition and if so to terminate the pregnancy with a therapeutic abortion. Eventually it would be possible to completely eliminate this dreadful disease. Dr. Coceani continues his investigations into the role of the exciting new group of substances, the prostaglandins. He has collaborated with Dr. John Steele in trying to assess the role of prostaglandins in migraine which is as common in childhood as in adults.

Dr. Rebhan, who is in charge of our Learning Clinic, sees children with various learning problems and perceptual handicaps and using a multi-disciplinary approach which includes Paediatrics, Psychology, Psychiatry, Social Work, and other departments such as Eye, Ear, Nose and Throat, etc. when deemed necessary, endeavours to determine the reason for the child's problems. Then in conjunction with the parents, teachers, and the Board of Education of the area in which the child lives, she structures a remedial programme.

Our efforts to establish a broadly based programme to deal with all aspects of mental retardation (that is, service, teaching, and research) in conjunction with the Ontario government, continue.

Sioux Lookout Project

The project of Delivery of Health Care to the Indians of Northwestern Ontario is now in its fourth year. It is a collaborative venture of the federal government and the Faculties of Medicine and Dentistry of the University of Toronto. In January 1971 we were fortunate to obtain the services of Dr. Gary Goldthorpe as Director of the Sioux Lookout Zone. His enthusiasm, ability, and drive have resulted in vast improvement of the entire project. Towards the end of 1971 the Department of Surgery of U. of T. joined the project on a continuing basis under the direction of Dr. Donald Wilson of Toronto Western Hospital, and the Department of Psychiatry likewise implemented a programme under the direction of Dr. Saul Levine of our own hospital. In the near future, the University's Department of Family and Community Medicine under Dr. Fred Fallis is planning a major input. Our M.S.C. School of Nursing has continued to send student nurses to Sioux Lookout Zone Hospital as part of their training programme.

It is our hope that the knowledge and experience gained in this project will go a long way in helping us solve the problems of delivery of health care to other under-doctored areas of our country.

During 1971 evaluation of the Sioux Lookout Project began under the direction of Dr. Robin Badgley, Chairman of the Department of Behavioural Science of the Faculty of Medicine, U. of T.

Division of Medical Education – Dr. J. Boone

After many months of planning, our first course for the training of Nurse Practitioners got under way at the end of 1971. This too is a collaborative venture with the University of Toronto School of Nursing and our own School of Nursing. In this first course, four field nurses from nursing stations in the Sioux Lookout Zone are receiving four months concentrated training. On completion of the course, they will return to their former positions. Similarly, courses in the future will be structured to meet the needs of Nurse Practitioners in specific areas.

VISITORS

Dr. U. Shehu, Almadu Bello University, Zaria, Nigeria; Dr. R.W. Townley, Royal Children's Hospital, Melbourne, Australia; Dr. Ernest McCoy, University of Alberta, Edmonton, Alberta; Dr. M.P. Keet, Karl Bremer Hospital, South Africa; Dr. Wen-Chieh Chen, Chinese Academy of Medical Sciences, Peking, China; Dr. Hsien-Wen Ha, Cancer Institute, Chinese Academy in Medical Sciences, Peking, China; Dr. Jen-Liu Yao, Chinese Embassy, Ottawa; Dr. Charlotte M. Anderson, Institute of Child Health, Birmingham, England; Dr. Albert Royer, Hospital Ste. Justine, Montreal, P.Q.; Dr. J. Rennie Marshall, Military Hospital, Tidworth, England; Dr. Irwin M. Arias, Albert Einstein College of Medicine, New York; Dr. Richard H.R. White, Children's Hospital, Birmingham, England; Dr. Harry Medovy, Children's Hospital, Winnipeg; Dr. Antonio Diez, Havana, Cuba; Dr. Heriberto Modero Pio, Havana, Cuba; Dr. Joaquin Pascual Gispert, Havana, Cuba; Dr. Reginald Lightwood, I.M.T. Hospital, Lady of Lourdes, Drogheda, Co Louth, Eire; Dr. E. Gautier, Switzerland; Dr. F. Rey, Paris, France; Dr. David Fearon, State Health Dept., Melbourne, Australia.

RESEARCH

In the field of allergy and under the direction of Dr. C. Collins-Williams, a study of the therapeutic effect of disodium cromoglycate in asthma and an investigation of serum and secretory IgA in Canadian children was completed. The use of provocative

bronchial and nasal testing, mould growth in the homes of allergic children, pollution as a precipitating cause of asthmatic attacks in children, and some aspects of delayed hypersensitivity are being investigated.

In the area of paediatric cardiology, studies directed by Dr. J.D. Keith on the natural history of congenital heart disease are continuing. Dr. B.S.L. Kidd is investigating the factors governing pulmonary resistance and haemodynamics in congenital heart disease. Dr. R.S. Fowler, in association with Dr. Henry O'Beirne of the Institute of Biomedical Electronics, is investigating new approaches for evaluation of the electrical activity of the heart. Dr. P.M. Olley, with Dr. W. Zingg of the Department of Surgery, is developing models of congenital heart disease in lamb foetuses. Dr. Olley, with Dr. F. Coceani, is investigating the role of prostoglandins in foetal adjustments to adult life. Dr. T. Izukawa is investigating the value of surgical and medical interventions in the very sick newborn with heart disease. He is studying pathological aspects of congenital heart disease. Dr. V. Rose is active in the creation of computer-assisted paediatric cardiology information retrieval system. She is also investigating the role of genetic factors in congenital heart disease and the effects of diet and drugs in children with hyperlipoproteinaemia.

In the field of endocrinology, studies under Dr. J.D. Bailey continued on the endocrine control of growth development. The nature of the growth failure in Turner's syndrome is being investigated. Dr. J.M. Martin continues his studies on the hypothalamic factor which regulates insulin secretion. This work originated from investigations that he started during an extended leave in various European centres. Isolation and identification of this factor is now in progress. In collaboration with Dr. Garay, Dr. Martin has shown that the secretion, but not the synthesis of both growth hormone and thyroid stimulating hormone, is regulated by intracellular cyclic AMP concentrations in the pituitary gland. Dr. Martin, with Dr. N. Howard, studied the mechanisms of the stimulation of growth hormone secretion by pentobarbital. Dr. D.K. Parkinson has recently joined our staff, following one year's study leave in Boston. He has initiated studies on the role of cyclic AMP in the regulation of calcitonine secretion. In collaboration with Dr. D. Fraser, he is exploring, with success, the possibility that the phosphaturic effect of parathyroid hormone is mediated by cyclic AMP. Dr. Donald E. Hill has recently joined our staff following an extended period of study under Dr. Donald Cheek, of Johns Hopkins University, in cellular aspects of growth and development. He has initiated studies on various aspects of intrauterine growth retardation in rhesus monkeys resulting from experimental placental insufficiency. Dr. R.M. Erlich is continuing his long-term studies on the vascular and renal complications of juvenile diabetes and on idiopathic hypoglycaemia. Dr. N. Howard, a recent appointee, is investigating, in collaboration with Drs. Martin and Parkinson, competitive protein binding assay methods for quantitative measurements of polypeptide hormones in biological materials. Dr. I.C. Radde is continuing her studies on calcium transport across membranes in various tissues. She is measuring calcium ion activity in blood in a wide range of pathological conditions in neonates and children. Dr. D. Fraser is continuing his long-term studies on various forms of bone disease in children. He is investigating in particular the mechanisms whereby hypomagnesaemia leads to hypocalcaemia in humans and dogs.

In paediatric gastroenterology, Dr. J.R. Hamilton and his group are studying the mechanisms of acute diarrhoea. In collaboration with the Ontario Veterinary College, Guelph, an animal model of transmissible viral enteritis in pigs was developed and is being studied. The possible therapeutic effects of hyperimmune cows' milk against enteropathogenic *E. coli* organisms and oral administration of lactobacilli are being investigated in infants with gastroenteritis. With Mrs. Alice Strangway, nutritional studies are being conducted in children with congenital heart disease. Dr. A. Sass-Kortsak and his group are continuing their studies on liver disease due to genetically induced metabolic derangements. In collaboration with Drs. Aspin, Cox, and Sarkar, Wilson's disease and other disorders of copper metabolism are studied. In collaboration with Drs. Cox, Hercz, Levison, and Lynch, a study on α_1 -Antitrypsin deficiency is in progress.

In the area of haematology, Dr. P.D. McClure and Dr. M. Sonley are involved in co-operative studies with Children's Cancer Group A (NIH). The use of BCG in leukaemia and that of diazotized leukaemic cells as a form of immunotherapy is being explored. Dr. P.D. McClure continues his work on the identification of Factor VIII by immunological techniques and is conducting various other studies on haemostasis in healthy and sick newborns. Dr. E.R. Saunders is continuing his studies on the control of cell division in leukaemia and on "myelopoietin." Dr. M.H. Freedman, a new member of the staff, is growing human bone marrow in short-term tissue cultures and is studying the effect of erythropoietin in children with various hypoplastic states.

In the field of infections, Dr. C.S. Anglin, in collaboration with Drs. Fleming (Bacteriology), Middleton (Virology), Jaya, Johnson, Murray, and Weber, is investigating therapeutic regimens for purulent meningitis, fulminating meningococcal sepsis, and the viral agents leading to aseptic meningitis. Further studies concern pertussis and the whooping cough syndrome and the antimicrobial therapy of shigellosis. The use of Zooster Immune Globulin, prepared by the Connaught Medical Research Laboratories, for prevention and modification of varicella in immunodepressed children, is being explored.

In the field of metabolic diseases, the studies of Dr. A. Sass-Kortsak and S.H. Jackson on cystinuria continued. They have also investigated the treatment of homocystinuria with pyridoxine. Dr. W.B. Hanley is conducting long-term clinical trials with the dietary treatment of phenylketonuria.

In the area of nephrology, long-term studies by light and electronmicroscopy on renal biopsies were continued by Dr. C.P. Rance in collaboration with the late Dr. M.J. Lynch of the Department of Pathology. Dr. Rance, in collaboration with Dr. T.M. Hunt, is evaluating the treatment of the nephrotic syndrome with cyclophosphamide. Dr. J.W. Balfe is completing his studies on erythrocyte sodium transport in cystic fibrosis, in patients who have undergone cardiopulmonary by pass and in hereditary spherocytosis. Dr. S.W. Kooh is investigating the methods of treatment of hypernatraemia in view of the danger of central nervous system complications of such treatment. He is studying the mechanism of hypocalcaemia which appears as a dangerous complication of hypernatraemic states. Dr. Kooh is also investigating calcium absorption in idiopathic transient osteoporosis and, in collaboration with Dr. Cummings of the Department of Radiology, various aspects of renal osteodystrophy. Dr. G.S. Arbus conducted studies on renal subcapsular pressure in dogs. He is investigating psychiatric and social problems in children on chronic dialysis treatment, with collaboration on the part of Dr. Van Leeuwen (Psychiatry) and Mrs. D. Matthews (Social Work). In collaboration with Drs. Trusler and Barkin (Surgery), the method of haemodialysis via a subcutaneous arteriovenous fistula is being explored.

In the area of paediatric neurology, a wide range of research activities were conducted. Dr. J.A. Lowden is primarily interested in brain lipids and their metabolism. Developmental aspects of this problem and alterations in disease are being investigated. A metropolitan Toronto-wide screening programme was started among the Jewish population, to detect carriers of Tay-Sachs disease. Dr. F. Coceani is working on problems of neural transmission and its modulation. The role of prostoglandins in brain function is being studied. In collaboration with Dr. L. Marco of Columbia University, the action of prostoglandin E_1 on neuromuscular transmission is being investigated. Dr. E.G. Murphy is studying nerve conduction velocity in prematures, in diabetes, and in renal failure and hereditary muscle disorders. Dr. J.C. Steele investigated anticonvulsant drugs.

In the field of *perinatal* paediatrics, Dr. P.R. Swyer and his group has studied aspects of assisted ventilation and especially nasal mask assisted intermittent positive pressure ventilation and functional residual capacity in infants with the respiratory distress syndrome. A long-term study in collaboration with Drs. Arstikaitis (Ophthalmology), Netley (Psychology), M.M. Wood (Statistics), Hawke and Liasao (Paediatrics) concerns the psychomotor development of survivors of neonatal intensive care. Dr. G.W. Chance and his group are investigating the metabolic peculiarities of premature, healthy, and sick newborns. A controlled study of supplemental intravenous

nutrition is under way. Further studies concern basic aspects of glucose homeostasis, factors affecting glucose utilization, and late metabolic acidosis.

In the area of pulmonary function and disease, Dr. H. Levison conducts studies in collaboration with a number of the staff. A pre- and postoperative study of lung function in scoliosis was completed. A study of residual pulmonary abnormalities in survivors from the idiopathic respiratory distress syndrome is continuing. A controlled investigation of mist-tent therapy and studies to determine the initial site of airway obstruction in cystic fibrosis is in progress. Studies on the maturation of pulmonary function with age, especially the relationship between mechanics of ventilation and airway closure, are continuing. Lung growth is being studied in hypopituitarism. Collaborating in these studies are Drs. Reilly (Radiology), Wood and Cunningham (Biostatistics), Bailey, Bryan, Collins-Williams, Crozier, Ham, and Swyer (Paediatrics).

In the field of systems analysis of health care delivery and community health, Dr. U.M. Anderson and her group have started a study on parental perception and behaviour in regard to childhood sickness and handicap. Collaborating in this study are Dr. C.M. Lanphier and the Survey Research Centre of York University.

HONOURS

C. COLLINS-WILLIAMS, elected President of the Association of Convalescent Homes and Hospitals for Asthmatic Children, 1972-3.

H. LEVISON, elected to the American Pediatric Society.

S.W. KOOH, member of the Society for Pediatric Research.

A. SASS-KORTSAK, Chairman, Medical Advisory Board, Canadian Hepatic Foundation.

P.K. LEWIN, President, Central Ontario Branch, Defence Medical Association.

SCHOLARLY ADDRESSES

C.S. ANGLIN, "The Management of Clinical Rabies," 62nd Annual Meeting of the Canadian Public Health Association, April 1971; "Results of Rubella Infection and Their Prevention," 62nd Annual Meeting of the Canadian Public Health Association, April 1971.

G.S. ARBUS, "Intravenous Fluid Therapy," Paediatric Nursing Conference for Registered Nurses, The Hospital for Sick Children, Toronto, May 1972.

J.W. BALFE, "Management of Fluid and Electrolyte Disorders in Paediatrics," University of Alberta, October 1971.

G.W. CHANCE, "Important Aspects of Neonatal Care," 15th Annual Scientific Assembly of the College of Family Physicians Meeting, Banff, 12-16 Sept. 1971; "A Controlled Study of Intravenous Fibrin Hydrolysate Supplement in Prematures 1.3 Kg," National Institute of Child Health and Human Development Interdisciplinary Conference on Hyperalimentation for High Risk Infants, Smithsonian Institution, Maryland, U.S.A., 26 October 1971; "Intravenous Glucose Tolerance in the New-born," National Institute of Child Health and Human Development Interdisciplinary Conference on Hyperalimentation for High Risk Infants, Smithsonian Institution, Maryland, 26 October 1971; "Glucose Assimilation in Neonates of Very Low Birth Weight," Canadian Society for Clinical Investigation, Annual Meeting, Toronto, 25 January 1972; "Perinatal Intensive Care," West Algoma Medical Academy, Sault Ste Marie, Ont., 16-18 March 1972.

C. COLLINS-WILLIAMS, "Nasal Provocation as a Diagnostic Air in Allergic Rhinitis," American College of Allergists, Texas, 9 March 1972; "Relationship of Atopic Disease and Immunoglobulin Levels with Special Reference to Selective IgA Deficiency," Midwest Forum on Allergy, 23 October 1971; "Serum IgA in Canadian Children," 13th International Congress of Paediatrics, Vienna, 31 August 1971.

R.S. FOWLER, "Clinical Analysis of Vector Signals in Children with Congenital Heart Disease," Institute of Bio-Medical Electronics and Engineering, University of

Toronto; "A PDP-8 System for Collecting Vector Electrocardiograms," Institute of Bio-Medical Electronics and Engineering, University of Toronto; "The Vectorcardiogram Assessment of Severity in Cystic Fibrosis," Canadian Paediatrics Society, June 1971.

J.R. HAMILTON, "Transmissible Gastroenteritis in Piglets (T.G.E.) An Acute Viral Enteritis causing Diarrhea," N.I.H. Symposium on "Activation of Adenyl Cyclase by Bacterial Enterotoxins," Baltimore, 1971; "Acute Viral Diarrhea," The Bronx-Lebanon Hospital, New York, March 1972; "Mechanism of Acute Diarrhea," St. Justine Hospital, March 1972, Montreal.

WM. A. HAWKE, "Minimal Brain Dysfunction," International Congress of Pediatrics, Vienna, Sept. 1971.

B.S.L. KIDD, "Sequelae to Surgery in Congenital Corrected Transposition of the Great Arteries," American Heart Association Scientific Sessions in Anaheim, California, November 1971; "The Unnatural History of Transposition of the Great Arteries," Ontario Medical Association, Toronto, May 1972.

S.W. KOOH, "Transient Childhood Osteoporosis of Unknown Cause," International Symposium of Metabolic Bone Disease, Detroit, June 1972.

S. LEVINE, "Urban Communes - Fact or Fad, Promise or Pipe Dream," American Orthopsychiatric Association, Detroit, April 1972; "Social and Psychological Factors in Amphetamine Abuse," International Symposium on Drug Abuse, Jerusalem, May 1972.

H. LEVISON, "Airway Closure in Children," Canadian Society for Clinical Investigation, Jan. 1972; "The Effect of Isoproterenol on Airway Closure in Healthy Adults," Canadian Society for Clinical Investigation, Jan. 1972; "Interdependence between Mechanical Resistances to Breathing and the Ventilatory Response to Hypercapnia and Hypoxia," Canadian Society for Clinical Investigation; "Mist Tent Therapy for Cystic Fibrosis," Society for Pediatric Research, May 1972; "Peculiar Mechanical Characteristics of the Child's Lung," Federation of American Societies for Experimental Biology, April 1972.

P.M. OLLEY, "Cardio-respiratory responses to severe hypoxaemia in Anaesthetised Dogs," Canadian Anaesthetists' Society Annual Meeting, June 1971; "Experimental Coarctation in Foetal Lambs," Canadian Federation of Biological Sciences, June 1971; "Effect of Drugs on the Atrioventricular Conduction System in Children," Canadian Society for Clinical Investigation; "His Bundle Electrocardiography in Children," Canadian Federation of Biological Sciences, June 1971; "Serum Digoxin Levels in Infants and Children," Canadian Cardiovascular Society, Saskatoon, 1971.

J.S. PRICHARD, "The Doctor in Society," 50th Anniversary of the British-American Hospital (Clinica Anglo-Americana), Alfredo Salazar s/n, San Isidro, Lima, Peru, October 1971; "The Physiology of Learning," First International Congress in Pediatric Neurology, Mexico, February 1972.

I.C. RADDE, "Plasma Magnesium Levels in Uraemic Children and in Neonates," International Congress of Pediatrics, Vienna, Austria.

C.P. RANCE, "Haematological problems in Chronic Renal Failures," Second International Symposium of Pediatric Nephrology, Paris, France.

A. REBHAN, "Medical Causes of Learning Disabilities," East York Board of Education, Toronto, 26 January 1971; "Dyslexia in Children," Scarborough Board of Education, Toronto, 4 February 1971; "Medical Causes of Learning Disabilities," East York Board of Education, Toronto, 16 February 1971; "Communication in Learning Disabilities," Ontario Institute for Studies in Education, Toronto, 19 May 1971; "The Neurologically Impaired," Ontario Department of Education, 6 July 1971; "Findings in Children with Learning Disabilities," and "Facets of Learning Disabilities," Peterborough Board of Education, 14 February 1972; "Drug Treatment in Learning Disabilities," Brantford Association for Children with Learning Disabilities, 20 April 1972.

A. SASS-KORTSAK, "Alpha₁ Antitrypsin Deficiency and its Relation to Liver Disease in Children," Montreal General Hospital, 23 November 1971.

P.R. SWYER, "Intravenous Alimentation in the Newborn," International Symposium on Intensive Care in the Newborn, Neonatologists and Anaesthetists, Storå Korno, Sweden, 21–25 August 1971; "Hypoxia and the Lung," Symposium 1, Perinatal Hypoxia, XIII International Congress of Paediatrics, Vienna, Austria, 29 August–4 September 1971; "Intravenous Alimentation," National Institute of Child Health and Human Development, Perinatal Biology and Infant Mortality Branch, Belmont, Smithsonian Institution's Conference Center, Elkridge, Maryland, 26–29 October 1971; "Respiratory Problems in the Neonate" and "The Respiratory Distress Syndrome of the Newborn," Pediatric Postgraduate Symposium, San Jacinto TB and Respiratory Disease Association and the Department of Pediatrics, Baylor College of Medicine, Houston, Texas, 11–13 November 1971; "The Present Status of the Respiratory Distress Syndrome of the Newborn," University of Rochester, New York, 20 November 1971; "Critical Assessment of New Methods of Management of Respiratory Failure in the Newborn," and "Respiratory Problems at Birth," Ninth Annual Postgraduate Seminar in Anesthesiology; "The Mother and Newborn – Recent Advances," The University of Florida and University of Miami, Miami Beach, Florida, 6–9 January 1972; "Management of Respiratory Distress Syndrome," University of Toronto Course on Paediatric Broncho-Oesophagology for Otolaryngologists at The Hospital for Sick Children, Toronto, 18–20 February 1972; "Newer Methods of Management of Respiratory Failure in the Newborn," The Royal Free Hospital, London, England, 6 April 1972; "The Use of Continuous Pressure Breathing – Techniques in the Management of R.D.S. in the Newborn," Hôpital Edouard-Herriot, Lyon, France, 17 April 1972; "Management of Respiratory Failure in the Newborn," Karolinska Sjukhuset, Stockholm, Sweden, 25 April 1972; "Acid Base Simplified," "Respiratory Failure in the Newborn," "Hypoglycaemia, Nutrition of the Low Birth Weight Infant, Hyperalimentation," "Transportation of the High Risk Mother and Baby," Tenth Annual Course on the High Risk Foetus and Newborn, University of British Columbia, Vancouver, B.C., 15–18 May 1972.

M.G. WOLFISH, "An Examination of Adolescent Sexuality," Springfield Hospital Medical Center, 24 May 1971; "Birth Control Counselling in an Adolescent Clinic," Canadian Paediatric Society, Kingston, Ontario, June 1971; "Delivery of Medical Care to Adolescents," Michigan Medical Society, Grand Rapids, Michigan, 6 October 1971; "A Pediatrician Views Adolescent Sexual Behaviour," Royal College of Physicians and Surgeons, Toronto, 28 January 1972; "Early Sexuality and the New Morality," F.J.W.O. Conference of Women, 30 November 1971; "Sexual Problems in Adolescence," St. Michael's Hospital Clinical Day, Toronto, 10 March 1972.

STAFF CHANGES

Deaths

Dr. Earl Krieger, 25 December 1971.

Resignations

Dr. John Steele, 31 January 1972.

New Appointments and Promotions

Dr. Reuben Baumal, Associate, 1 February 1972; Dr. Jacqueline Carlson, Clinical Teacher, 15 December 1971; Dr. A.W. Conn, Assistant Professor, 1 March 1972; Dr. E. Diane Cox, Assistant Professor, 15 October 1971; Dr. Melvin Freedman, Clinical Teacher, 1 July 1971; Dr. Donald Hill, Assistant Professor, 1 July 1971; Dr. David Parkinson, Assistant Professor, 1 July 1971; Dr. Noreen L. Rudd, Clinical Teacher, 1 October 1971; Dr. L. Siminovitch, Associate Professor, 1 March 1972; Dr. Joan Whitfield, Clinical Teacher, 1 July 1971; Dr. Barry Zimmerman, Associate, 1 February 1972.

PUBLICATIONS

- Anglin, C.S. "Immunization against Rubella" (*Ontario Medical Review*, Apr. 1971)
- "Immunization Procedures for Children in Canada" (*Canadian Family Physician*, Feb. 1971)
- Chance, G.W. (with Salle, B. and Ruiton-Ugliengo, M.) "Glucose Assimilation in Neonates of Very Low Birth Weight" (*Clinical Research*, vol. 19, 1971, p. 767)
- Collins-Williams, C. (with Chiu, A.W., Lamenza, C., Lewis-McKinley, C.A., Williams, H., and Levison, H.) "Treatment of Bronchial Asthma with Disodium Cromoglycate (Intal) in Children" (*Annals of Allergy*, vol. 29, 1971, pp. 613-20)
- Collins-Williams, C. *et al.* "Incidence of Isolated Deficiency in IgA in the Serum of Canadian Children" (*Annals of Allergy*, vol. 30, 1972, pp. 11-23)
- "The Relationship of Atopic Disease and Immunoglobulin Levels with Special Reference to Selective IgA Deficiency" (*Clinical Allergy*, vol. 1, 1971, pp. 381-6)
- Fowler, R.S. *et al.* "Pulmonary Atresia with Intact Ventricular Septum: Report of 50 cases" (*Paediatrics*, vol. 47, Feb. 1971, p. 370)
- Hamilton, J.R. (with McNeill, L.K.) "The Effect of Fasting on Disaccharidase Activity in Rat Small Intestine" (*Paediatrics*, vol. 47, 1971, p. 65)
- "Celiac Disease. Response to treatment and to dietary gluten" (*Proceedings of the XIII International Congress of Pediatrics*, vol. 2, 1971, pp. 191-7)
- Hamilton, J.R. *et al.* "A Clinical and Metabolic Study of an Intravenous Feeding Technique using Peripheral Veins as the Initial Infusion Site" (*CMAJ*, May 6, 1972, pp. 969-74)
- "Transmissible Gastroenteritis in Piglets (TGE). A Model of Study of Acute Viral Diarrhea" (*Journal of Pediatrics*, vol. 80, June 1972, pp. 925-31)
- Hawke, W.A. *et al.* "Developmental Assessment of Jamaican Infants" (*Developmental Medicine and Child Neurology*, vol. 13, Oct. 1971, pp. 582-9)
- Izukawa, T. "Late Trifascicular Heart Block Resulting from Cardiac Surgery" (*Circulation*, vol. 64, 1971, pp. 11-181)
- Kidd, B.S.L. *et al.* "Improved Prognosis in Ventricular Septal Defect"; in *The Natural History and Progress in Treatment of Congenital Heart Defects*, ed. B.S.L. Kidd and J.D. Keith. Springfield: Charles C. Thomas 1971, pp. 5-13
- "Transposition 1969"; in *ibid.*, pp. 127-37
- Kidd, B.S.L. and Keith, J.D. *The Natural History and Progress in Treatment of Congenital Heart Defects*. Springfield: Charles C. Thomas 1971
- Levine, S. "Brief Psychotherapy with Children: A Preliminary Report" (*Yearbook of Psychiatry and Applied Mental Health*, 1972, pp. 107-8)
- "Brief Psychotherapy with Children: Process of Therapy" (*American Journal of Psychiatry*, vol. 128, Aug. 1971, pp. 141-6)
- "Draft Dodgers in Canada" (*Psychiatric Spectator*, vol. 6, Aug. 1971)
- "The Speed User: Social and Psychological Factors in Amphetamine Abuse" (*Canadian Psychiatric Association Journal*, vol. 17, June 1972, pp. 229-41)
- Levison, H. *et al.* "The Measurement of Fluid Deposition in Humans following Mist Tent Therapy" (*Pediatrics*, vol. 48, 1971, pp. 605)
- "Effects of Ultrasonically Nebulized Distilled Water on Airway Dynamics in Children with Cystic Fibrosis and Asthma" (*Journal of Pediatrics*, vol. 80, 1972, p. 396)
- "Relationship between Anatomic Dead Space and Body Size in Health, Asthma and Cystic Fibrosis" (*Amer. Rev. Resp. Dis.*, vol. 104, 1971, p. 215)
- "Symptomatic Pulmonary Emphysema in Childhood associated with Hereditary Alpha₁ antitrypsin and Elastase Inhibitor Deficiency" (*Journal of Pediatrics*, vol. 79, 1971, p. 20)
- "Thoracic Compliance in Normal Children during Anesthesia" (*Acta Anaesthesiologica Scandinavica*, vol. 15, 1971, p. 179)
- Murphy, E.G. *et al.* "Genetics of Childhood Spinal Muscular Atrophy" (*Journal of Medical Genetics*, vol. 8, July 1971, pp. 143-8)
- Murray, J.D. "Treatment of H. Influenzae Infection"; in *Current Paediatric Therapy*, by Gellis and Kagan, 5th ed.
- Olley, P.M. *et al.* "The Effects of Hypoxia in Pneumonectomised Puppies and Minipigs" (*Circulation Research*, vol. 28, Apr. 1971, pp. 397-402)
- "Surdo-cardiac Syndrome: Incidence among Children in Schools for the Deaf" (*Canadian Medical Association Journal*, vol. 105, Oct. 1971, pp. 718-20)
- Rance, C.P. *et al.* "Bilateral Renal Artery Stenosis in association with Neurofibromatosis (Recklinghausen's disease): Report of two cases" (*Journal of Pediatrics*, vol. 80, May 1972, pp. 804-11)
- Rebhan, A. "Facets of Learning Disabilities" (*Canadian Family Physician*, June 1971)
- Rose, V. "Endocardial Fibroelastosis: Family Studies with Special Reference to Counselling" (*Journal of Paediatrics*, vol. 29, Sept. 1971, pp. 385)
- Sass-Kortsak, A. "Hepatolenticular Degeneration (Kinnear Wilson's Disease)" (*Handbuch der Inneren Medizin*, vol. 7/1, July 1971)
- Sass-Kortsak, *et al.* "Biochemical and Genetic Studies in Cystinuria: Observations on Double Heterozygotes of Genotype 1/11" (*Journal of Clinical Investigation*, vol. 50, 1971, pp. 1961-76)

- Steele, J.C. *et al.* "Acute Cerebellar Ataxia and Concomitant Infection with Mycoplasma Pneumoniae" (*Journal of Pediatrics*, vol. 80, Mar. 1972, pp. 467-9)
- Stewart, D.A. *et al.* "Diagnosis and Treatment of Throat Infections in Children" (*CMAJ*, vol. 105, 1971, pp. 69-71)
- "Enuresis Treated by an Improved Waking Apparatus" (*ibid.*, 106, 1972, pp. 27-9)
- Swyer, P. *et al.* "Assisted and Controlled Ventilation in the Newborn Period: Effect on Oxygenation" (*British Journal of Anaesthesia*, vol. 43, 1971, pp. 926-31)
- "Comparison of Descending Aortic and 'Arterialised' Capillary Blood in the Sick Newborn" (*Canadian Medical Association Journal*, vol. 106, 1972, pp. 660-2)
- Swyer, P.R. "Management of the Neonate"; in *Care of the Critically Ill Child*, ed. R.S. Jones and J.B. Owen-Thomas, pp. 162-221. London: Edward Arnold 1971
- "An Objective Multi-factorial Linear Discriminant Scoring System for Neonates with the Respiratory Distress Syndrome" (*Biologia Neonatorum*, vol. 18, 1971, pp. 263-78)
- "The Organization and Operation of a Regional Neonatal Referral Centre" (XIII International Congress of Paed. Vienna, Austria, *Separatum*, 1971, p. 474)
- "Pulmonary Function during the First Year of Life in Recovering R.D.S." (*Pediatric Research*, vol. 6, 1972, pp. 428/168)
- "Special Physiological and Physiopathological Considerations Relevant to Intensive Care in the Newborn"; in *Care of the Critically Ill Child*, ed. R.S. Jones and J.B. Owen-Thomas, pp. 142-61. London: Edward Arnold 1971
- Turner, J.A.P. "Staphylococcal Pneumonia" (*Clinic Pediatrics*, vol. 11, 1972, p. 69)
- Wolfish, M.G. "Birth Control Counselling in an Adolescent Clinic" (*CMAJ*, vol. 105, Oct. 1971, pp. 750-3)
- "The Turmoil of the Teens" (*Canadian Family Physician*, vol. 17, Aug. 1971, pp. 38-9)

PATHOLOGY

Under the direction of Professor A.C. Ritchie

The principal need of the Department remains, as it has for several years, the provision of adequate space and adequate staff in the teaching hospitals to enable it to fulfil satisfactorily its teaching and investigative work, as well as to meet its clinical responsibilities. As teaching becomes more decentralized into the hospitals, and as the need for men with special skills in the various subspecialties of pathology to meet modern academic requirements becomes greater and more urgent, both new facilities and additional staff will become increasingly necessary. The continuing development of the Faculty makes it necessary to consider how best each hospital may develop the kind of pathology unit it should have, how special services will be shared and co-ordinated among the hospitals, and how these units should react to the needs of the University and the community as a whole.

The course in General Pathology given at the end of Period I continued under a committee chaired by Dr. H.Z. Movat. The pattern of teaching continued much as last year, with modification and evolution. The teaching of the "science" of general pathology was again achieved more satisfactorily than was the introduction of the students to the concept of disease as it affects the patient, and further efforts to teach more efficiently the pathological basis of practice are needed.

The major responsibility in undergraduate medical teaching remains, however, in Period II. The demands made on the Department remain heavy, in contact time with students, and particularly in the time needed to prepare teaching material. The load sometimes falls particularly heavily when teaching is decentralized into one of the hospitals with a relatively small staff in pathology. One of the principal weaknesses of the teaching of pathology in the new curriculum has been the lack of co-ordination between systems, and great differences in the quality and type of teaching between one system and another. In an attempt to overcome these problems, a special committee has been set up in Period II under the chairmanship of Dr. M.D. Silver to determine how pathology was taught in the various systems and hospitals, and to suggest how it might better be presented.

The course in General Pathology for Dental Students continued under the direction of Dr. N.S. Taichman, with the help of Dr. H. Freedman, and continued to meet the needs of the students. Particular note should be made of its success in relating pathological processes to the needs and practice of dentistry.

A new course in pathology for students of pharmacy was introduced conjointly with the Department of Clinical Biochemistry. Dr. J.B. Cullen served as co-ordinator for the Department. The course for students in nursing continued under Dr. J.B. Walter.

The postgraduate programmes for residents training in pathology and other disciplines continued as in previous years. The many lecture courses and seminars given to residents in the Department and in other departmental programmes continued, and particular mention must be made of the load borne by Dr. W. Anderson.

The refresher course for Pathologists in Practice was given as in past years conjointly with the Departments of Microbiology and Clinical Biochemistry under the direction of Dr. H.T.G. Strawbridge. Once again, it proved very successful. Members of the staff also participated largely in a course in the Pathology of the Ear given with the Department of Otolaryngology.

Dr. Movat became secretary of the Graduate Department of Pathology and was in charge of the programmes given in the Graduate School. Dr. Simon's course in Ultrastructural Pathology continued as in previous years.

It is with regret that we record the death of Dr. M.J. Lynch who came to the Department when he joined the staff of The Hospital for Sick Children in 1964, and who played a prominent role both in his hospital, and in the Department as a whole.

The Department congratulates Dr. W.D. Donohue who retired this year from his post as Chief of Pathology at The Hospital for Sick Children, and is pleased that he will be continuing his association with the Department as Professor Emeritus. The Department also congratulates Dr. N.S. Taichman on his appointment to the Chair of the Department of Oral Pathology, School of Dental Medicine at the University of Pennsylvania, and is sorry only that this means that he must leave us. We were sorry to lose Dr. P.K. O'Brien, who leaves Sunnybrook to take up the position of pathologist in the new Etobicoke General Hospital; Dr. P. Symchych who left The Hospital for Sick Children to return to New York; Dr. A.G. Bhagwat, who left St. Michael's to return to a post in India; Dr. K. Udaka, who has been appointed to head the new Hoffmann-LaRoche Institute in Japan; Dr. P. Feldman, who has left St. Michael's Hospital to return to the United States, and Dr. R. Herst, who has relinquished her post at the Toronto General Hospital.

We also wish a very happy retirement to Miss C. Bell and Miss E. Lowrey who retired from their posts after many years in the Department.

We are particularly happy to welcome Dr. J. Huber on his appointment as Pathologist-in-Chief at The Hospital for Sick Children and Professor in the Department. Dr. Huber comes to us from the Dijkzigt Hospital in Rotterdam and we hope that he will spend many happy and profitable years with us. We also welcome Dr. N. Kerenyi, who comes from Dalhousie to join the staff of Sunnybrook Hospital as an Associate Professor; Dr. Y.C. Bédard, who joins the staff at the New Mount Sinai Hospital after completing his training in Toronto; Dr. K. Pritzker, who comes to New Mount Sinai from McGill University; Dr. J. Bilboa, who comes to St. Michael's Hospital with a particular interest in neuropathology; Dr. A. Chalvardzian, who returns to St. Michael's Hospital with special training in gynaecological pathology; Dr. L. From, who joins the staff at Sunnybrook Hospital; Dr. L. Tao, who has come to the Toronto General Hospital in cytopathology; Dr. K. Shumak, who has joined the Department of Haematology in the Toronto General; and Dr. S.M. Fletch, who has joined the Department of Laboratory Haematology of Sunnybrook Hospital. We also welcome Dr. R. Falk of the Department of Surgery, Dr. P. Farkashidy and Dr. G. Hawke of the Department of Otolaryngology, and Dr. G. Blandford of the Department of Medicine, who took up cross-appointments in the Department this year.

Among the distinguished visitors to the Department were: Dr. W.M. Thurlbeck,

McGill University; Captain V.J. Hyams, Armed Forces Institute of Pathology, Washington; Dr. B.S. Blumberg, Institute for Cancer Research, Philadelphia; Dr. E.A. Smuckler, University of Washington, Seattle; Dr. Jesse E. Edwards, St. Paul, Minnesota; Dr. G. Baroldi, Milan, Italy; Dr. C. Carrington, Yale University; Dr. J.B. Hay, Royal Postgraduate Medical School, London, England; Dr. W.N. Gibbs, University of the West Indies, Kingston; Dr. M. Worwood, Welsh National School of Medicine, Cardiff, and Dr. R.M. Bannerman, Medical Genetics Unit, State University of New York at Buffalo. Dr. D. Pal, Assistant Professor at the Maulana Azad Medical College, New Delhi, India, has spent the year in the Department, working as a Colombo Plan Fellow in Dermatopathology, under the guidance of Dr. Walter.

Division of Neuropathology

Again this year the professional staff and resident trainees of this Division participated in the Period IIA neuroscience teaching. The format of the lectures was changed from previous years in that combined lectures using clinician and pathologist were presented to the students and for the most part were well received. Because of a shortage of staff, seminar teaching was to groups of 20 to 30 students, but such large groups were not satisfactory for this type of teaching. A total of 8 hours of lectures and 9 hours of seminars was given during the 5-week period, representing a reasonable balance overall. The drawbacks of teaching the neurosciences at this early time in Period II are the general lack of understanding of basic pathological processes caused by insufficient time spent in instruction in general pathology and a lack of knowledge of the cardiovascular and respiratory systems. It should also be stressed that to perform such concentrated teaching, routine hospital service work and postgraduate training programmes had to virtually cease.

The number of residency training positions remains at six. The practice of oral and practical examinations as part of the in-course assessment for neuropathology trainees has continued as before and proved useful both to staff and trainee. In addition to the individual hospital programmes, the members of the division met weekly throughout the academic year, rotating between the various hospitals. The nature of this weekly meeting has varied, being run by faculty and students, as well as incorporating a monthly slide session which enables trainees to be exposed to interesting material in the Toronto area. The weekly meetings of the neuroscience seminars and Toronto Neurological Society add to our own programme to make a broad, well-rounded schedule for training in Neuropathology at this University centre. Together, these weekly meetings constitute the Neuropathology course of the Pathology Department programme of the School of Graduate Studies.

RESEARCH

At the Toronto General Hospital and Banting Institute, Dr. Simon, Dr. Pinkerton, and Dr. Bédard have continued their study by radioautography of the absorption of rion from the gut in normal and *sla* mice. With Dr. Chamberlain, Dr. Simon has investigated the lymphoid tissue of the lung; with Dr. Hwang the ultrastructure of the thymus; with Dr. Luk the microcirculation in bone and the life cycle of osteoblasts, and with Dr. Nopajaroonsri, the microcirculation in the lymph node.

Dr. Raick has continued his studies of carcinogenesis, with particular reference to the nature of promotion in epidermal carcinogenesis, and to the changes in the skin produced by carcinogens and promoting agents.

Dr. Anderson, with Dr. Macnab of the Department of Surgery has studied the anatomy and diseases of the shoulder, with a view to devising means of improving the surgical treatment in this area.

Dr. Thompson has prepared a film on "Smokers Lungs" in conjunction with the Department of National Health and Welfare, and the National Film Board.

Dr. Phillips has continued to study human and experimental liver disease, with particular attention to experimental fructose intolerance, the effect of maternally

administered drugs on the foetal liver, and the effect of diet, pyrazol, and alcohol. He has also studied the fine structure of various human tumours and other lesions.

Dr. Silver has studied the basement membrane changes in the heart in diabetes and myxoedema, and is investigating the myocardial changes associated with infarction. He has also investigated the cardiac changes associated with heart transplantation, and with aorta-coronary bypass procedures.

Dr. van Nostrand has continued his studies of the extension and behaviour of carcinoma of the larynx. With Dr. Morgan of the Department of Preventive Medicine, Dr. Gardner is beginning a study of the genetics and epidemiology of breast cancer.

In collaboration with Dr. H. Schachter of the Department of Biochemistry and Mrs. Christine Tilley, Mrs. Crookston has studied the transferases in human serum which determine the blood groups A₁ and A₂, and with Dr. Wherrett of the Department of Medicine and Mrs. Tilley has studied blood group substances in the glycophospholipid fractions of human serum. With Mrs. J. Middleton, she has investigated the clinical and genetic importance of the Chido blood-group system, and with Miss R. Rachkewich has investigated the Ii antigens on red cells and lymphocytes. With Professor T. Dacie of London, Ontario, and Dr. R.L. Verwilghen of Belgium, she has reviewed the clinical and laboratory features of hereditary erythroblastic multinuclearity.

At The Hospital for Sick Children, Dr. Conen and Dr. Cutz have studied foetal tissues, with particular reference to the relation between amniotic cells and the foetus. They have continued their work on the *APUD* glands and with Dr. Wolfish of New Mount Sinai Hospital have studied normal and abnormal thyroid, and have continued their study of foetal thyroids. Dr. Conen has collaborated in a study of the spread of herpes simplex virus *in vivo* and *in vitro*, and in studies of human biopsy material. With Dr. Lewin, he has continued his work on fluorescent nuclear sexing.

In Sunnybrook Hospital Dr. Cruickshank and Dr. Tam have continued their study of metabolic bone disease.

Dr. Pinkerton has investigated the behaviour of thromboplastin preparations, and with Dr. Fletch is studying the inherited anaemia of dwarfed Malamnic dogs.

At the Toronto Western Hospital, Dr. Rabinovich has continued his work on metabolic bone disease.

In the Medical Sciences Building, Dr. Fisher with Dr. Bloxam and Dr. Yousef has continued to study the hepatic circulation of bile acids, and has demonstrated sex differences. Studies of the effect of ethionine on amino acid and bile acid metabolism have also continued and with Dr. Langer and Dr. Stone of the Department of Surgery studies of hepatic blood flow.

Dr. Movat continued his studies on the plasma kinin system. Factor XII was isolated and highly purified, and it was shown that trypsin and plasmin split this blood-clotting factor, releasing a fragment, prekallikrein activator, which converts the zymogen prekallikrein to kallikrein. The latter acts on kininogen. Preliminary data indicate that kallikrein acts, primarily, on an anionic high molecular weight kininogen, which was separated from a more cationic low molecular weight kininogen. Continuation of earlier studies on PMN-leukocytes, in collaboration with Dr. N.S. Ranadive, indicates that these cells phagocytose latex particles, but release phlogistic substances and hydrolytic enzymes only when the particles are coated with γ -globulin. Antigen-antibody precipitates and mildly aggregated, complement-fixing γ -globulin are ingested and induce release, but highly aggregated γ -globulin, although taken up by the cells, induces no release.

Dr. Ranadive has investigated the mechanisms involved in the release of inflammatory agents from polymorphonuclear leukocytes with emphasis of the biochemical events involved in the uptake and release of phagocytosed particles. Dr. Taichman has studied the release of lysozomal complexes by soluble hydrolases induced immune complexes and the role of platelets in the Forssman reaction. Dr. Udaka has continued to attempt the isolation of mediators of inflammation from inflammatory cells and has developed *in vitro* models.

RESEARCH

Division of Neuropathology

The following areas of investigation are currently under way or nearing completion:

(1) Histographic, histochemical and electron microscopic study of various human neuromuscular diseases has been continued as in previous years. A detailed study of a patient with unusual cellular inclusions and a type 1 atrophy is nearing completion (Drs. Lemay, Rewcastle, and Humphrey).

(2) A study of further cases of subacute spongiform encephalopathy by electron microscopy and intracerebral inoculation is continuing in conjunction with the National Institutes of Health, Bethesda (Drs. Rewcastle and Gadjusek).

(3) Anatomico-functional areas of the human thalamus are being studied following electrode stimulation and the recording of the human responses (Drs. D. Armstrong, Tasker, and Rewcastle).

(4) A postmortem human study is under way of the clinical correlation of lesions produced following percutaneous cordotomies, in an attempt to improve our knowledge of spinal cord structure (Drs. Tasker and Rewcastle).

(5) In conjunction with the Department of Physics, a study of the physical, clinical, and pathological effects of intrathecal Thorotrast has been completed (Drs. Tucker, Harrison and Rewcastle).

(6) A study of cell mediated immunity in neurologic diseases (myasthenia gravis, polymyositis, multiple sclerosis) is being continued with emphasis on the role of thymus in the regulation of this type of immunity (Dr. R.M. Armstrong).

During this academic year, grants were received from the Muscular Dystrophy Association of Canada.

HONOURS

Dr. A.C. Ritchie was appointed Chairman of the World Commission on Education in Pathology of the World Association of Pathology Societies, and was re-elected Chairman of the Pathology Committee of the Royal College of Physicians and Surgeons of Canada. He was elected a Fellow of the Royal College of Pathologists of Australia. Dr. P.H. Pinkerton was elected to the Fellowship of the Royal College of Physicians of Edinburgh and was re-elected to the Board of the International Committee for Standardization in Haematology. Dr. N.S. Taichman was appointed M.R.C. Visiting Professor at the University of Manitoba, Winnipeg. Dr. M.D. Silver was elected a Fellow of the Royal College of Pathologists of Australia and awarded the M.D. degree of the University of Adelaide. Dr. M.M. Fisher was awarded the 1972 Medal in Medicine of the Royal College of Physicians and Surgeons of Canada. He was elected to the American Association for the Study of Liver Diseases. Dr. W.L. Donohue was elected President of the Paediatric Pathology Club of North America in November 1971. Dr. Y.C. Bédard was awarded the degree of Ph.D. in May 1972.

SCHOLARLY ADDRESSES

Dr. H.Z. Movat spoke on the role of the contact phase of blood coagulation in the activation of the kinin-forming system at the II Congress of the International Society on Thrombosis and Haemostasis in Oslo, Norway, July 1971; on guinea pig prekallikrein activator at the Symposium on Vasoactive Polypeptides, in Florence, Italy, July 1971; on the relationship between the plasma kinin system and the contact phase of blood coagulation in man, at the Symposium on Vasoactive Polypeptides, in Florence, Italy, July 1971; on the role of plasmin in the activation of the kinin system, at the Symposium on Vasoactive Polypeptides, Florence, Italy, July 1971; on the interrelationship between the blood clotting, fibrinolytic, and kinin systems at the Second Mediterranean Congress on Thromboembolism in Istanbul, Turkey, October 1971; and on the interrelationship between the kinin, blood clotting, and fibrinolytic systems at the 20th Annual Colloquium on Protides of the Biological Fluids, in Brugge, Bel-

gium, May 1972. Dr. H.A. Gardner and Dr. L.C. Tao reported on Werner's syndrome to the Ontario Association of Pathologists, October 1971. Dr. Marie Crookston spoke on A and B blood group substances in a glycosphingolipid fraction of human plasma at the Canadian Society for Clinical Investigation in Toronto, January 1972 and on the ABH, Lewis and Ii antigens at the Symposium on Immunohematology and Blood Transfusion, organized by the Rochester Regional Red Cross Blood Program and the Department of Medicine of the University of Rochester School of Medicine, June 1972. Dr. J.H. Crookston spoke on antilymphocytic serum and canine cardiac allograft rejection to the Royal College of Physicians and Surgeons, Toronto, 1972, and on a history of blood transfusion, to a meeting of the Medical Historical Society of Western New York State in Buffalo, November 1971. Dr. D. Armstrong presented a paper on hemistrophy of the brain at the Annual Meeting of the Canadian Association of Pathologists, October 1971. Dr. N.B. Rewcastle was invited to speak at the 3rd Pan American Congress of Neurology on "Slow Virus Infection and the Nervous System" as part of the major symposium on recent advances in "Viral and Immunologic Diseases of the Nervous System," held at São Paulo, Brazil, October 1971. Dr. N.B. Rewcastle with Dr. H.J.M. Barnett presented a paper on Clinical and Pathological Aspects of Lafora's Disease at the 3rd Simposio Neurologico "J.M. Ramos Mejia" in Buenos Aires, October 1971. Dr. N.B. Rewcastle was a guest lecturer at the Neurological Institute of the University of Mexico City and read two papers: "Slow Viral Infections of the Nervous System" and "Striato-nigral Degeneration," October 1971. Dr. N.B. Rewcastle participated in the refresher course for pathologists in practice, University of Toronto, February 1972. Dr. R.M. Armstrong spoke on the immunological aspects of myasthenia gravis at the Neurological Institute, Columbia Presbyterian Medical Center, New York, in March 1972; on current research in myasthenia gravis, at the Division of Neurology, Montreal General Hospital, April 1972, and on immunological abnormalities of thymic lymphocytes in myasthenia gravis, at the American Academy of Neurology, Annual Meeting, St. Louis, April 1972. Dr. D. Abbott presented a paper entitled "A modified whole blood partial thromboplastin test for the assessment of heparinization" to the Annual Meeting of the Clinical Research Society of Toronto, April 1972. Dr. A.H. Sepp lectured on sudden unexpected deaths to the Basic Educational Course for Coroners, Toronto, May 1972. Dr. S. Rabinovich spoke on renal osteodystrophy in patients undergoing chronic peritoneal dialysis to the Clinical Research Society of Toronto, March 1972; on contrasting bone changes in patients on chronic haemodialysis and chronic peritoneal dialysis, June 1972, and on histology of metabolic bone disease at the Symposium on Metabolic Bone Disease, Toronto Western Hospital, October 1971. Dr. M.D. Silver presented a paper on the morphology of fascia lata heart valve prosthesis at the 24th Annual Meeting of the Canadian Cardiovascular Society, Saskatoon, October 1971. Dr. M.M. Fisher and Dr. K. Miyai spoke on the effects of chenodeoxycholic acid on hepatic function and structure to the 11th Annual Meeting of the American Society for Cell Biology, New Orleans, November 1971; Dr. Fisher and Dr. Yousef presented papers on further studies on the sex difference in CDCA metabolism in rats and on the sex differences in bile acid metabolism of human bile to the American Association for the Study of Liver Diseases, Chicago, November 1971; Dr. Fisher, Dr. Phillips, and Dr. Yu spoke on the ultrastructural characterization of "Byler" bile at the Canadian Society for Clinical Investigation, Toronto, January 1972; Dr. Fisher presented a paper on bile acids, sex, and the liver to the Royal College of Physicians and Surgeons of Canada, Toronto, January 1972; Dr. Fisher and Dr. D.L. Bloxam spoke on the effects of ethionine on amino acid concentrations in livers of female rats and Dr. Fisher and Dr. Yousef spoke on the effects of ethionine on bile acids of male rat bile, both papers being presented at the Federation of American Societies for Experimental Biology, Atlantic City, April 1972; a paper by Dr. Fisher on the sex difference in bile acid composition of human bile was read by title at the American Association for the Study of Liver Diseases, Dallas, May 1972. Dr. V.L. Fornasier addressed the Ontario Association of Pathologists on the radiological examination of bone and cartilage in October 1971; Dr. Fornasier spoke on transient childhood osteoporosis of unknown cause, at the Calcium & Bone

Club of Toronto, May 1972. Dr. G.J. Laroye, Dr. W.D. Leers, and Dr. N.A. Russell presented a paper on cerebellar abscess due to blastomyces dermatiditis to the Ontario Association of Pathologists, October 1971. Dr. N.S. Taichman spoke on the immune mechanisms in periodontal disease at the Faculty of Dentistry, University of Manitoba, Winnipeg, December 1971; he addressed the Postgraduate Group, Eastman Dental Center, Rochester, N.Y. on the role of platelets and polymorphs in immune cytotoxic reactions, and took part in the Frontiers of Dental Research Seminars held at the Eastman Dental Center, speaking on host-parasite interactions leading to tissue injury in periodontal disease; Dr. Taichman also took part in the Research Week Seminars, Harvard School of Dental Medicine, Boston, speaking on platelets, polymorphs, and immune vascular injury. He addressed the combined American meeting of the Canadian Academy and American Association of Endodontists in Montreal on the Inflammatory response and its role in the etiology of disease, and the Ontario Dental Association, Toronto, on dental plaque – how does it cause disease? Dr. D. Pantalony spoke on haemolytic anaemias at the Toronto Institute of Medical Technology in January 1972; on haematologic pathology to the refresher course for practising pathologists, February 1972; on blood component therapy in March 1972, and transfusion reactions in April 1972, both at the Toronto Institute of Medical Technology; on personal quality control in haematology to the Quality Control Seminar of the Ontario Society of Medical Technologists in April 1972. Dr. P.E. Conen, with Dr. P. Genest and Dr. J. Poty, presented a paper on chromosome structural rearrangement. Comparative use of autoradiography and fluorescence microscopy to the Genetic Society of Canada in Quebec City, June 1971; Dr. Conen, Dr. P.E. Lewin, and Dr. J. Kegel spoke on antenatal identification of foetal sex to the Genetic Society of Canada in Quebec City, June 1971; Dr. Conen and Dr. J. Rajcani addressed the xxiiird Annual Meeting of the Society of Czechoslovak Pathologists in Prague, in September 1971, on the subject of electron microscopic observations on pathogenesis of spread of herpes simplex virus in mice; they also spoke on the same topic at the Symposium on Morphology and Pathology of the Abacterial Inflammatory Processes of the Nervous System, in Leipzig, Germany, in October 1971; Dr. Conen, Dr. N.E. Diamant, and Dr. K. Grubner spoke on the histochemical characteristics of dog esophageal striated muscle at the Canadian Association of Gastroenterology, Annual Meeting of the Royal College of Physicians and Surgeons of Canada in Ottawa, in January 1972; Dr. Conen, Dr. R.B. Surana, Dr. J.D. Bailey, and Dr. M.W. Thompson reported on the Russell-Silver syndrome: 8 cases, one with XX/XY mosaicism to the American Pediatric Society in Atlantic City, May 1972; and Dr. Conen and Dr. A.S. Chan spoke on the ultrastructural observations on the development of the human foetal thyroid at the meeting of the Canadian Federation of Biological Societies, Cell Biology, in Quebec City, June 1972. Dr. Margaret G. Norman spoke on the pattern of lesions resulting from perinatal anoxia, and on cyanosis and congestive heart failure in a neonate at the National Institute of Neurology, Mexico City, Mexico, June–July 1971; on antenatal neuronal loss and gliosis of the brain stem, thalamus, and hypothalamus at the Tenth Annual meeting of the Canadian Association of Neuropathologists, in Vancouver, October 1971; on the destruction of the reticular formation of the brain stem to the Pediatric Pathology Club Interim Meeting in Toronto, November 1971; on “The Doctor in Court” to the York County Medical Association and York County Legal Association Joint Meeting in Aurora, March 1972; and on leukodystrophies and demyelinating diseases in childhood at a neuroscience seminar (Academy of Medicine, Toronto; Toronto Neurological Society and Neuroscience Committee), University of Toronto, Toronto, March 1972.

STAFF CHANGES

Deaths

Mrs. D. Little, Laboratory Assistant, 3 October 1971; Dr. M.J. Lynch, Associate Professor, 11 June 1972.

Retirements

Miss C.A. Bell, Secretary, Neuropathology, 30 June 1972; Dr. W.L. Donohue, Professor (now Professor Emeritus), 30 June 1972.

Resignations

Dr. A.H. Anwar, Assistant Professor, 30 June 1972; Dr. P. Feldman, Associate, 30 June 1972; Dr. R. Hearst, Associate, 31 May 1972; Dr. J.F. Mustard, Visiting Professor, 30 June 1972; Dr. P.K. O'Brien, Assistant Professor, 30 June 1972.

Promotions

To *Associate Professor*: Dr. C. Ezrin, 1 July 1971; Dr. P. Conen, 1 July 1971; Dr. A. Raick, 1 July 1971; Dr. N.S. Taichman, 1 July 1971.

To *Assistant Professor*: Dr. A.H. Anwar, 1 July 1971; Mrs. M. Crookston, 1 July 1971; Dr. J.B. Cullen, 1 July 1971; Dr. J.H.N. Deck, 1 July 1971; Dr. R. Falk, 1 July 1971; Dr. M.G. Norman, 1 July 1971; Dr. M. Platts, 1 July 1971; Dr. A.H. Sepp, 1 July 1971.

To *Associate*: Dr. D. Bloxam, 1 August 1971; Dr. N.B. Cooter, 1 July 1971; Dr. H. Farquharson, 1 July 1971; Dr. V. Fornasier, 1 July 1971; Dr. W.J. Francombe, 1 July 1971; Dr. R. Hearst, 1 July 1971; Dr. G. Laroye, 1 July 1971; Dr. M. Lipa, 1 July 1971; Dr. A. Medline, 1 July 1971; Dr. C.S. Norman, 1 July 1971; Dr. D.E. Ryder, 1 July 1971; Dr. J.G. Scott, 1 July 1971; Dr. R.M. Armstrong, 1 July 1971; Dr. A. Sass-Kortsak, 1 July 1971.

To *Clinical Teacher*: Dr. L.S. Mautner, 1 July 1971.

New Appointments

Professor: Dr. J. Huber, Professor vice Donohue, 1 May 1972.

Assistant Professor: Dr. R. Falk, 1 July 1971; Dr. P. McClure, 1 Jan. 1972.

Associate: Dr. A. Alvi, 1 July 1971; Dr. P. Feldman, 1 July 1971; Dr. J.F.K. Mancner, 1 July 1971; Dr. J.S. Senn, 1 July 1971.

Clinical Teacher: Dr. L.S. Tao, 1 Jan. 1972.

Research Associate: Dr. E. Cutz, 1 July 1971; Dr. S.M. Fletch, 1 Nov. 1971; Dr. E. Horvath, 1 Jan. 1972.

PUBLICATIONS

Adachi, F., Yu, D., and Phillips, M.J. "An Ultrastructural Study of Fructose Induced Hepatic Cell Injury: Comparison of Human and Experimental Lesions" (*Virchows Archiv B. Zell-pathologie*, vol. 10, 1972, pp. 200-9)

Armstrong, R.M. "Immunologic Mechanisms in Neurologic Diseases" (*Medical Clinics of North America*, vol. 56, 1972, p. 2)

Bhagwat, A.G., Ross, R.C. (with Currie, D.J.) "Ultrastructure of Normal Human Liver" (*Archives of Pathology*, vol. 93, 1972, pp. 227-39)

Bhagwat, A.G. (with Kelly, M.) "Ultrastructural Features of a Recurrent Endothelial Myxoma of the Left Atrium" (*Archives of Pathology*, vol. 93, 1972, pp. 219-26)

Bhagwat, A.G. (with Wong, P.) "Effect of pH in Direct OsO₄ Fixation on Glycogen Staining as Shown by Electron Microscopy" (*Stain Technology*, vol. 47, 1972, pp. 39-40)

Brown, T.C. (with Fitzpatrick, P.J. and Reid, J.) "Malignant Melanoma of the Head and Neck: a Clinico-pathological Study" (*Canadian Journal of Surgery*, vol. 15, 1972, pp. 90-101)

Brown, T.C. (with Mitchell, R.I., Peters, M.V., and Rideout, D.) "Laparotomy for Hodgkin's disease: some surgical observations" (*Surgery*, vol. 71, 1972, pp. 694-703)

Burrowes, C.E., Movat, H.Z., and Soltay, M.J. "The Kinn System of Human Plasma. vi. The Action of Plasmin" (*Proceedings of the Society of Experimental and Biological Medicine*, vol. 139, 1971, pp. 959-66)

Conen, P.E. (with Chan, A.S.) "Ultrastructural Observations on Cytodifferentiation of Para-follicular Cells in the Human Fetal Thyroid" (*Laboratory Investigation*, vol. 25, 1971, pp. 249-59)

Conen, P.E. (with Higurashi, M.) "Comparison of Chromosomal Behaviour in Cultured Lymphocytes and Fibroblasts from Patients with Chromosomal Disorders and Controls" (*Cytogenetics*, vol. 10, 1971, pp. 273-85)

—— "In vitro Chromosomal Radiosensitivity in Patients with Chromosomal Abnormalities" (*Pediatric Research*, vol. 6, May 1972, pp. 514-20)

- "In vitro Chromosomal Radiosensitivity in Fanconi's Anemia" (*Blood*, vol. 38, 1971, pp. 336-42)
- Conen, P.E. (with Kegel, J.) "Nuclear Sex Identification in Human Tissues: a Histologic Study using Quinacrine Fluorescence" (*American Journal of Clinical Pathology*, vol. 57, 1972, pp. 425-530)
- Conen, P.E. (with Lewin, P.K.) "Fluorescent Y Screening of Hospitalized Newborns" (*Nature*, vol. 233, 1971, pp. 334-5)
- Conen, P.E. (with Lewin, P., Vakil, D. and Kegel, J.) "Clinical Applications of Fluorescent Nuclear Sex Tests" (*Proceedings XIII International Congress of Pediatrics* 1971, pp. 101-7)
- Conen, P.E. and Rajcani, J. "Observations on Neural Spread of Herpes Simplex Virus in Suckling Mice" (*Acta Virologica*, vol. 16, 1972, pp. 31-40)
- Conen, P.E. (with Surana, R.B.) "Inherited Pericentric Inversion of a Group D (13-15) Chromosome" (*Journal of Medical Genetics*, vol. 9, 1972, pp. 105-9)
- Conen, P.E. (with Surana, R.B. and Bailey, J.D.) "A Ring-4 Chromosome in a Patient with Normal Intelligence and Short Stature" (*Journal of Medical Genetics*, vol. 8, 1971, pp. 517-21)
- Conen, P.E. (with Surana, R.B. and Bain, H.W.) "Trisomy-18 in a 15-year-old Female" (*American Journal of Diseases in Children*, vol. 123, 1972, pp. 75-7)
- Conen, P.E. (with Surana, R.B. and Forbath, P.) "Minute Y chromosome" (*Annales Génétiques*, vol. 14, 1971, pp. 145-8)
- Conen, P.E. (with Wilson, R.B., Hartroft, W.S. *et al.*) "Prenecrotic Changes in Myocardium of Rats Fed an Infarct-producing Diet" (*Archives of Pathology*, vol. 91, 1971, pp. 307-17)
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PHARMACOLOGY

Under the direction of Professor W. Kalow

One of the major aims of the Department has been to emphasize effective teaching, and all members of the academic staff and graduate students have made a contribution. Distinctive responsibilities in the teaching programme for undergraduate students were assumed by the following staff: Professor Llewellyn Thomas began his duties as Period I Co-ordinator in the Medical Curriculum. Professor W. Kalow served as chairman of the Pharmacology Topic Committee, Professor L. Spero was appointed chairman of the Gastrointestinal System Committee; Professor E.A. Sellers has assumed the responsibility of organizing new teaching activities in pharmacology during Period II. The Pharmacology Course for students of Pharmacy was given under the direction of Professor G.E. Johnson; for students of Dentistry under Professor F.A. Sunahara; for students of the Arts and Science Faculty under Professor W. Roschlau. In addition, the Department offered nine different courses in the School of Graduate Studies. Professor A.K. Sen served as graduate secretary of the Department.

The summer student programme of the Department was again organized by Professor J. Khanna. The largest number of summer students worked on problems pertaining to non-medical use of drugs, but many other work projects were also offered. Special thanks for support of the summer student programme are due to Burroughs Wellcome & Company (Canada, Ltd.,) and to CIBA-Geigy (Canada) Ltd.

Many indices pointed to a satisfactory functioning of the Department. One may cite, for instance, the increased number of applicants for graduate studies in pharmacology in the face of a general decrease of applications; the student assessments of departmental teaching activity; the participation of staff on various editorial boards and granting agencies inside and outside Canada; the publication of two books by members of this Department, in addition to numerous publications in scientific journals. On the other hand, some serious shortcomings exist which prevent the Department from properly fulfilling its role within the Faculty, the University, and Society. The first serious shortcoming is still a deficiency of clinical pharmacology. In this area of direct concern for patient care, this Department is lagging far behind others in leading universities. The second shortcoming is in the area of Toxicology. This lack becomes increasingly glaring in view of increasing demand. While, for instance, present staff participate in the activities of the Institute of Environmental

Sciences and Engineering, limitations on time do not permit the undertaking of teaching and research obligations to the desirable extent.

Professor E.A. Sellers was elected to the Governing Council of this University.

Dr. Derry's decision to resign his position as Assistant Professor and M.R.C. Scholar was received with much regret. Towards the end of the academic year, Dr. David Stewart joined the Department as Research Associate.

Graduate students have completed the following theses: for the Ph.D. degree – Shailesh P. Banerjee, "Studies on $(\text{Na}^+ + \text{K}^+)$ -ATPase as a Diuretic Receptor for Sulfhydryl Reagents"; A. Eugene LeBlanc, "Behavioral and Pharmacological Variables in the Development of Ethanol Tolerance"; Sheldon H. Roth, "Anesthetics on Membranes"; Andrew Y-C. Shum, "Biosynthesis and Metabolism of Catecholamines in Stress"; Michael David Willinsky, "Pharmacological Studies on $^1\text{Trans-Tetrahydrocannabinol}$."

For the M.Sc. degree – Beverley A. Britt, "Malignant Hyperthermia – a Pharmacogenetic Disease"; Mary E. Besley, "The Interaction of Chlordiazepoxide and Ethanol"; Wai-Ming Chen, "Interaction of Prostaglandin E_1 and Norepinephrine on Contractile and Rubidium Efflux Responses in Vascular Smooth Muscle"; Shashikant M. Chittal, "Measurement of Ionized Calcium and Calcitonin in Laboratory and Clinical Investigation"; Ian G. Kerr, "The Role of Catecholamines in Morphine Analgesia"; G.Y.J. Lin, "Microsomal Ethanol Oxidizing System of Rat Liver: an *in vitro* and *in vivo* Study"; Kathryn D. Simpson, "Serotonin and the Blood Brain Barrier"; John Thomas Simpson, "The Metabolism of DL-threo-Dihydroxyphenylserine- C^{14} in the Dog."

VISITORS

Dr. Douglas R. Waud, Department of Pharmacology, Harvard Medical School, Boston, Mass., U.S.A.; Dr. Lloyd Beck, Department of Pharmacology, University of Ottawa, Ottawa, Ontario; Dr. Roger H. Bowman, Department of Pharmacology, State University of New York at Syracuse, N.Y., U.S.A.; Dr. Gerhard Levy, Department of Pharmaceutics, State University of New York at Buffalo, N.Y., U.S.A.; Dr. N. Robbins, Department of Anatomy, Case Western Reserve University, Cleveland, Ohio, U.S.A.; Dr. Paul Domenech, Department of Experimental Medicine, University of Chile, Santiago, Chile; Dr. David Colquhoun, Department of Pharmacology, Yale University, New Haven, Conn., U.S.A.; Dr. B.R. Nechay, Department of Pharmacology and Toxicology, University of Texas Medical Branch, Galveston, Texas, U.S.A.; Dr. L. Magos, MRC Toxicology Unit, Medical Research Council Laboratories, Woodmansterne Road, Carshalton, Surrey.

RESEARCH

Report from the Laboratory of Professor D.M. Derry

Professor D.M. Derry continued the studies reported last year for only part of the current year because of his resignation. His results regarding the shift of radio-labelled triglycerides between various organs in the neonatal rat, and factors determining these shifts, are being published.

Report from the Laboratory of Professor L. Endrenyi

Mr. F.H.F. Kwong continued his studies on the design and analysis of hyperbolic binding and kinetic experiments. He showed that, in experiments with constant absolute error, use of the linear plot c vs. c/v (or c_f vs. c_f/c_b in binding studies) leads to the most precise and accurate parameters if the number of observations is fairly small, $n < 15$ (here v is the reaction velocity, and c_f , c_b and c are the free, bound, and total substrate concentrations, respectively). The same linear plots are preferred also when the coefficient of variation is constant and the (free) concentration is scaled in harmonic or geometric progression. With other concentration arrangements the plot

of v vs. v/c (or c_b vs. c_b/c_f) should be preferred. With a larger number of observations the parameters should be estimated by (weighted) non-linear regression.

With the help of Mr. B.H. Dingle, optimal designs were analysed for experiments which are characterized by a single exponential function. These include many tracer- and pharmaco-kinetic studies which follow intravenous drug administration. If the experimental error does not vary with time, then for maximal precision of the parameters, approximately one-half of the measurements should be obtained as soon after the start of the experiment as possible (say, at t_0) so as to obtain the highest attainable response, y_0 . The other half of the observations should be made at a time $t_0 + 1/k$, leading to response equal to y_0/e (k is the decay [elimination] constant). The results emphasize the futility of observations beyond two half-lives after the first measurement. Optimal designs have been evaluated also for the case of constant coefficient of variation.

Report from the Laboratory of Professor Charles H. Hockman

An assessment of physiological and behavioural variables in humans smoking marijuana cigarettes, with Dr. James Duffin and Dr. Harold Kalant. In this study, experienced subjects smoked cigarettes containing either 6 or 12 mg of Δ^1 -tetrahydrocannabinol. The auditory response (AER) was recorded from the scalp to "click" stimuli, pulse measured continuously, and the subjects were required to perform a simple reaction time test (RT) and estimate the passage of 20 sec (TE). When compared with control measures, there were no differences in RT and TE. With both doses of THC, the pulse quickened at the onset and reached a peak at 10 min. Although the auditory evoked potential was unchanged by the drug, an uncertainty potential (cognitive) that followed the AER was markedly attenuated.

Experimental midbrain lesions: neurochemical comparison between the animal model and Parkinson's disease, with Kenneth G. Lloyd, Irene J. Farley, and Oleh Hornykiewicz, in adult cats, the substantia nigra (SN), in either the right or left hemisphere, was lesioned with an RF current. Following recovery, animals were sacrificed at intervals of 1, 4, 8, and 16 days, and both caudate nuclei removed. In all animals of the 4-, 8-, and 16-day groups in which the lesions destroyed a large portion of the SN, the dopamine concentration was below normal levels in the CN ipsilateral to the lesion, and L-Dopa decarboxylase activity was invariably reduced. L-glutamic acid decarboxylase and serotonin (5-HT) levels were also assessed. While there was no change in the former, values for the latter were significantly decreased in the CN ipsilateral to the lesion if striatopetal 5-HT neurons were destroyed. These results showed that some neurochemical changes in the striatum were comparable to those found in Parkinson's disease, while others were not.

Limbic forebrain and midbrain modulation and phase-switching or respiratory neurons, with Dr. James Duffin. In these experiments with adult cats, regions of the medulla, near the obex, were explored with a microelectrode until either an inspiratory or an expiratory neuron was identified, while the phrenic neurogram was recorded in order to distinguish between the phases. We found that low-intensity electrical stimuli delivered to discrete regions of the central gray substance of the midbrain or ventral hippocampus not only decreased the frequency of firing of expiratory neurons but switched the phase to inspiration before the termination of the stimulus. In these experiments, limbic system stimulation had no effect on inspiratory neurons. These results would suggest that these limbic forebrain and midbrain influences are modulating neuron populations that appear to play a prepotent role in the synchronization of bulbar respiratory events, in a manner analogous perhaps to imbalances produced by emotional and other stressful stimuli.

Differential effects produced by Δ^1 -tetrahydrocannabinol on lateral geniculate neurons, with Detlef Bieger. The active ingredient of marijuana, Δ^1 -tetrahydrocannabinol, exerts a differential effect on lateral geniculate neurons in the rat. Neurons that fire when the eye is illuminated are inhibited by the drug, whereas those that discharge in the dark, but are inhibited by light, either remain unchanged or increase

their rate of firing. This dual effect has also been observed on lateral geniculate synaptic field potentials. Preliminary results also suggest that these effects might be mediated by midbrain raphe 5-HT-containing neurons.

Report from the Laboratory of Professor O. Hornykiewicz

The following research projects have been undertaken for the year 1972: (1) sensory system and biogenic amines in *Lumbricus terrestris*. Aim: elucidation of biological functions of biogenic amines in the nervous system in lower (submammalian) species. (2) Nigro-Striatal Dopamine Neurones and Bulbar Motor Functions. Aim: pharmacological study of central dopamine receptor, role of striatum in drug-induced dyskinesias. (3) Uptake of Dopamine into Human Striatal Synaptosomes. Aim: determination of uptake capabilities of control patients using postmortem material and variation in different disease states. (4) Study of Monoamines and Associated Enzymes in Discrete Brain Regions of Control and Parkinsonian Patients. Aim: to measure any variation between control and parkinsonian patients as to dopa decarboxylase, tyrosine hydroxylase, glutamic acid decarboxylase; dopamine, homovanillic acid, dopa, 3-O-methyldopa, serotonin and 5-hydroxyindoleacetic acid. (5) Measurement of serotonin and its metabolite in human brain from normal patients, patients with Parkinson's disease, and patients who committed suicide. Also measurements in lesioned cat brains. Aim: to determine distribution and turnover of serotonin in normal human brains and how this is affected in Parkinson's disease and in depression. (6) Chronic and acute treatment with L-Dopa, chlorpromazine on monkey brains. Aim: to see effect of L-Dopa and chlorpromazine on amines (catecholamines and metabolites) in monkey brains. (7) Effects of drugs effecting serotonin metabolism on continuous avoidance behaviour and escape behaviour under titration schedule in rats. Aim: to explore the relationships between serotonin metabolites and behaviour under aversive control. (8) Morphine and brain dopamine metabolism. Aim: to find correlations between effects of morphine on brain dopamine metabolism and effects on motility.

Report from the Laboratory of Professor C. Hsia

The research activities in this laboratory can be classified into roughly two categories: (1) Basic Research: in this laboratory we are interested in the relationship between the structure and the function of biological membranes and the understanding of the mechanism of drug action on a molecular level. We approach this problem from two directions, namely, we study the membrane in its native state and model systems where the detailed information concerning the interaction between various membrane components could be obtained. We are confident that our effort in this area will greatly advance our knowledge about this fundamental problem. (2) Applied research: a clinically very important analytical technique is being developed in this laboratory in collaboration with Professor W. Kalow. The technique is called "electron immunoassay." This technique is most desirable in the hospital emergency ward where the proper treatment of a drug overdose patient depends heavily on the accurate and rapid identification of the drug in question. Electron immunoassay is capable of detecting the presence of trace amounts (nanograms) of drug or toxic substances in body fluids in a matter of minutes. The realization of this technique is the combination of experiences in electron spin resonance spectroscopy, immunochemistry, and organic chemistry. Other clinically useful analytical techniques using nuclear magnetic resonance spectroscopy, mass spectroscopy, gas chromatography, and automation with computer analysis are currently being explored in this laboratory.

Report from the Laboratory of Professor G.E. Johnson

Research proceeded along several lines. In co-operation with Doctors Mahon, Zsoter, and Wilson, studies into the effect of renal failure on the retention of drugs in patients were conducted. The tetracycline antibiotic "doxycycline" was investigated in normal subjects and in patients suffering renal damage. It was established that the half-life of the drug was extended in patients suffering renal failure. The antibiotic "gentamicin"

was also studied during the current year. This valuable antibiotic is capable of producing serious side effects if its concentration in the plasma rises too high. During the current year it was established that patients suffering renal damage have a decreased ability to excrete gentamicin and demonstrate an increased plasma level of the drug. Therefore, extreme caution should be used in treating patients with renal failure with gentamicin. Reserpine, a drug used to treat high blood pressure, is extensively metabolized in the body. Its half-life in the body is not increased when given to patients suffering renal failure as its half-life is dependent on rate of metabolism rather than rate of renal excretion. These results obtained in our laboratory during the past year have established the safety of reserpine in patients suffering renal damage. A programme studying the biliary excretion of drugs has been carried out in the past year. It has been shown that some drugs lost from the body in the bile are carried into the bile by transfer mechanism that are also related to the transfer of normal bile salts. Drugs secreted into the bile by the liver influence the biliary excretion of normal bile salts. The influence of the environment on the distribution of drugs in the body has been studied. Cold exposure has been shown to increase the level of at least one drug (pentobarbital) in such tissues as the brain, heart, kidney, and liver. The higher concentration of a drug in the brain increases the hypnotic effect on the animal.

Report from the Laboratory of Professor H. Kalant

The addiction research group, under Professors H. Kalant, J.M. Khanna, and Y. Israel, has carried on a broad programme of investigation of metabolic and behavioural changes resulting from chronic administration of alcohol, cannabis, barbiturates, opiates, and other drugs. In work with Mr. G. Lin, the liver microsomal ethanol-oxidizing system was shown to be a combination of NADPH oxidase and a catalase-like enzyme, produced artificially by tissue disruption and playing no role in alcohol metabolism *in vivo*. Other studies of alcohol metabolism, involving hepatic redox state in the whole rat (Mrs. J. Loth), and mitochondrial oxidations in liver slices and isolated perfused livers (Mr. L. Videla and Mr. J. Bernstein) are aimed at discovering the adaptive changes in cytoplasmic and mitochondrial enzymes of rats fed alcohol chronically, which permit more rapid oxidation of ethanol by the alcohol dehydrogenase pathway.

The earlier study of effects of pyrazole on the production of fatty liver by a single large dose of alcohol has been extended to include 4-methylpyrazole, in both male and female rats. In addition, the chronic administration of pyrazole and alcohol is being examined as a possible means of producing alcohol hepatitis and true portal cirrhosis in the rat.

Studies of acute and chronic drug effects on brain chemistry have explored changes in uptake and release of norepinephrine in brain cortex slices (Mr. A. MacDonald and Mr. F.J. Carmichael), electrically stimulated release of acetylcholine (Mr. J. Clark), and turnover of serotonin (Mr. D. Frankel). Changes in handling of these transmitters are being correlated with alterations in adenosine triphosphatase activity and brain microsomal protein synthesis, during development of tolerance to, and physical dependence on, alcohol, morphine, and other drugs. In connection with this work, adaptive changes in basic mechanisms of cell-membrane functions are being studied.

With the aid of ^{14}C -labelled tetrahydrocannabinol (THC), Dr. M. Willinsky and Miss N. Woo completed a study of distribution of THC and its metabolites in blood and tissues of rats at intervals of up to 48 hours after a single moderate dose. This work has been extended by Mrs. K. O'B. Fehr, who has compared blood concentrations and plasma protein binding of these substances after administration of ^{14}C -THC by smoke inhalation and by intravenous injection in rat plasma and in polyethylene glycol. She also completed an analysis of cannabinoid and tar content in the smoke of marijuana burned under different conditions simulating human smoking practices. Mr. A.J. Siemens has used the same ^{14}C -THC to study the pathways and kinetics of THC meta-

bolism by rat liver microsomal enzymes. These studies are now being repeated in animals treated chronically with cannabis.

Drug interactions have been investigated both at metabolic and at behavioural level. Ethanol was found to have no acute effect on disappearance of meprobamate from the whole body of the rat, but chronic ingestion of ethanol led to acceleration of meprobamate metabolism (Mr. G. Ho). In contrast, ethanol diminished pentobarbital metabolism by isolated liver slices, but pentobarbital had no effect on ethanol metabolism. Explanation of these interactions is being sought in terms of a possible role of alcohol dehydrogenase in the metabolism of hydroxylated derivatives of these drugs.

Administration of cannabis has also been shown to exert a strong inhibitory influence on the metabolism of hydroxylated derivatives of these drugs.

Administration of cannabis has also been shown to exert a strong inhibitory influence on the metabolism of pentobarbital, while phenobarbital inhibits that of THC. The effect of cannabis persists for as long as three days after the last dose (Mr. Siemen, Mr. Ho). At the behavioural level, THC was found to cause a dose-dependent enhancement of the effect of alcohol on motor performance in the rat (Dr. A.E. LeBlanc). This enhancement depends critically on the time interval between administration of the THC and measurement of the effect.

Mr. N. Rangaraj has succeeded in preparing plasma membrane fractions of high purity by the free-flow electrophoresis technique, and is comparing various enzyme activities and sialic acid levels in preparations from normal rat liver, Morris hepatoma 5123tc, and host liver.

Report from the Laboratory of Professor W. Kalow

Professors T. Inaba and D. Kadar, in collaboration with Professor G.E. Johnson, investigated elimination rates of various drugs in man. As expected, there were large person-to-person variations in the elimination of each drug. However, the observations suggest that there may be rapid and slow eliminators of certain groups or classes of drugs, so that experiences of a patient with one drug may permit predictions regarding his response to other drugs of the same elimination class. In the process of these studies, Professor Inaba developed a new micro method for the determination of amobarbital, Professor Kadar for gluetethimide, and Dr. J. Brien for diphenylhydantoin. Their methods far exceed the sensitivities and reliabilities of those previously described in the literature. Dr. B.A. Britt continued to investigate malignant hyperthermia, a rare complication of anaesthesia which occurs on the basis of a hereditary predisposition. Means of recognizing the predisposition prior to anaesthesia were explored. Investigations of 15 affected sibships with over 1000 individuals indicated that the predisposition can be recognized in the majority but not all cases by measuring creatine phosphokinase in plasma. Mrs. M. Terreau has confirmed the observation made here last year that excised skeletal muscle of affected subjects is hypersensitive to stimulation by caffeine; this is proof that the predisposing genetic defect is located in muscle. With the help of Dr. J. Cummings at the University of Guelph a sufficient number of pigs, genetically predisposed to malignant hyperthermia, have been bred so that experimental investigations into the mechanism of hyperthermia and rigidity can be pursued in these animals. Dr. Z. Harant set up human and animal fibroblast cultures and started to measure the uptake of radiolabelled drugs by the cells in culture. Miss S. Kim is investigating drug carriage in plasma by albumin, lipids, and lipoproteins.

Report from the Laboratory of Professor W. Mahon

See report of Department of Medicine.

Report from the Laboratory of Professor W.H.E. Roschlau

The effects of brinolase (fibrinolytic enzyme from *Aspergillus oryzae*) on blood platelet function have been investigated. Platelet aggregation was studied photometrically in canine platelet-rich plasma (PRP) with adenosine diphosphate (ADP)

and in human PRP with ADP and collagen. Single systemic infusions of thrombolytic doses of brinolase into dogs resulted in more than 50 per cent inhibition of platelet aggregation for 2–3 days. This effect was dose-dependent, as shown *in vitro* after incubation of canine and human PRP with the enzyme. Fibrinogen degradation products (FDP) derived from brinolase digestion of plasma fibrinogen of dog and man and purified human fibrinogen quantitatively inhibited aggregation of canine and human PRP. Enzyme doses used *in vitro* related to commonly employed clinical dosage, indicating that inhibition of platelet aggregation will accompany thrombolytic therapy with brinolase. Electronmicroscopy of enzyme-treated platelets showed morphological integrity and presumed viability after exposure to aggregation-inhibiting doses, i.e. no proteolysis. It was tentatively concluded that brinolase effects on platelets are similar to those of plasmin: inhibition of aggregation occurs through generation of secondary FDPs, obtained with usual thrombolytic (non-toxic) dosage.

Report from the Laboratory of Professor P. Seeman

(1) We have developed a long-acting and irreversible tranquillizing drug. (2) We have found that the same cell mechanisms underlie both general and local anesthesia. (3) We are localizing the sites of action of morphine and tranquillizers in the brain. (4) We are studying the actions of drugs on nerve and muscle cells of varying sizes. (5) We have introduced the new technique of freeze-fracture-etch electron microscopy into the Faculty of Medicine. By means of this new method, we have discovered the cellular lesions involved in the destruction of red blood cells during a mismatched blood transfusion reaction. (6) We have found that the opiate narcotics, as well as the active ingredients of marihuana, expand and anaesthetize biological membranes. (7) We have worked out experimentally the basic rules of drug action on nerve membranes, and have thus provided direct support for the "Hydrophobic Expansion Theory of Anesthesia," originally proposed in this laboratory.

Report from the Laboratory of Dr. E.A. Sellers

Professors E.A. Sellers and K.V. Flattery have continued an investigation on the effects of hyperthyroidism and hypothyroidism on the metabolism of adrenaline and nor-adrenaline. With Professor G. Steiner (Department of Medicine), the importance of thyroid function on the metabolic changes which occur during exposure to cold has been examined. While thyroid hormone is essential for survival in a cold environment, it appears that most of the adaptive changes which occur are not dependent on increased hormone production. With Drs. Calvin Ezrin and I. Stratmann (Departments of Pathology and Medicine), the radioautographic study of pituitary referred to last year has been extended. Cells which produce growth hormone "turnover" more rapidly than other cell types. Stimulation of thyrotrophin-producing cells (by lowering thyroid hormone in the circulation) results in production of more thyrotrophs and labelled thyroidectomy cells.

Professor E. Schönbaum, collaborating with Professor M.-L. Desbarats-Schönbaum, completed studies on the kinetics and action of propylthiouracil, an anti-thyroid drug. Together with Professor G. Steiner (Department of Medicine), Professor E. Schönbaum edited a book on Immunosympathectomy.

Professor M.-L. Desbarats-Schönbaum, in the course of studies on the thyroid gland *in vitro*, completed experiments which showed that the immediate effect of thyroid stimulating hormone is to increase hormone release by the thyroid.

Report from the Laboratory of Professor A.K. Sen

In collaboration with Dr. S.P. Banerjee, mechanism of action of both diuretic (ethacrynic acid) and non-diuretic (N-ethylmaleimide) sulphydral reagents on the different intermediary steps in the reaction sequence of the (Na + K)-ATPase has been worked out. This work has resulted in four publications and also a dissertation for a Ph.D. programme for Dr. S.P. Banerjee. In collaboration with Mr. W.H. Knox, the mechanism of action of aldosterone has also been worked out. It is being concluded from

this work that aldosterone mediates its function by stimulating a synthesis of (Na + K)-ATPase. Mr. Knox has developed a technique for the solubilization of the rat kidney ATPase. The synthesis of the enzyme was followed after aldosterone treatment in adrenalectomized rats by incorporating labelled amino acids into the enzyme system and its isolation and purification. Three papers are in preparation. A study on the Mechanism of Action of Lithium ion in Affective Disorders has been initiated. The human experimentation part of this project is being conducted in collaboration with Dr. H. Stancer of the Clarke Institute.

In collaboration with Professors F.A. Sunahara and J. Talesnik, satisfactory progress has been made to elucidate the participation of Cyclic AMP in the control of Metabolic Coronary Dilation. The work will be presented at the International Congress, San Francisco, 1972. Collaborative work is also under progress with Professor E.A. Sellers to look into the role of Cyclic AMP in cold acclimation. Dr. David Stewart has recently joined this group and will concentrate on purification studies of the (Na + K)-ATPase. He has brought with him the knowledge of an automotive system for the assay of this enzyme. With his help it is expected that satisfactory progress in this line will soon be made.

Report from the Laboratory of Professor L. Spero

We have been using both hydrophobic fluorescent probes and electron spin resonance probes to investigate the structure of plasma membranes and membrane conformation changes which occur as a result of drug interactions.

We have shown that different families of anaesthetics have different binding sites, unlike the simplistic lipid solubility theories which really should only be interpreted as "rules." The extent of penetration of an anaesthetic into the membrane does seem to be related to anaesthetic potency, and is a function of charge as well as the hydrophobic nature of the molecule.

A correlation has been observed between the age of human erythrocytes and their ability to bind hydrophobic probes. Old erythrocytes (aged *in vitro* or *in vivo*) have an increased number of hydrophobic binding sites and the environment of the membrane proteins are altered. These changes may explain the increased fragility of "older" erythrocytes and also their greater sensitivity to lytic agents. Radiolabelled primaquine binding is presently being studied as function of cell age.

Using a spin labelled derivative of myristic acid amide we have demonstrated (in collaboration with Dr. J.C. Hsia) that cross-membrane translocation of this fatty acid is asymmetric, the inward translocation being slower than the outward rate. This has been confirmed using "inside-out" ghosts. This further demonstrates the asymmetry of the plasma membrane, and this technique can be extended to study the movements of "membrane pumps" etc. to determine to what extent membrane translocation by the macromolecule is involved in their activity.

Using a plasma membrane vesicle preparation of guinea pig ileum smooth muscle, we have demonstrated the presence of an acetylcholine sensitive receptor which controls membrane ion permeability, similar to that found in the whole muscle. This receptor system is blocked by atropine. Concentrations of acetylcholine which *in vivo* produce muscle contraction, produce conformation changes which can be detected by using a fluorescent probe, but there is only a small effect on the membrane sodium permeability. This supports our ideas on the importance of cell-cell coupling in smooth muscle.

In a number of membrane systems we have demonstrated that tetrodotoxin (TTX), the neurotoxin which selectively blocks the sodium channel, while not inducing a membrane conformation change itself (as monitored by fluorescent probes) does block the conformation change induced by increasing sodium ion concentration. The receptor for this effect is not observed in "inside-out" ghost preparations, nor in liposomes made from the lipids extracted from the membranes. Changes produced by other monovalent and divalent cations are not effected by TTX. The sensitivity of the membrane seems related to their electrophysiological sensitivity to TTX, but erythro-

cyte and smooth muscle membranes also show this property, implying a more universal distribution of the receptor even in the absence of a normal physiological role.

Report from the Laboratory of Professor F.A. Sunahara

The effects of various cardioactive agents (catecholamines, calcium ions, DMPP) on cardiac activity and coronary flow were investigated in the presence of prostaglandin E (PGE) or phosphodiesterase inhibitor, diazoxide. The effects of the above agents on cardiac tissue cAMP levels are also being investigated. These studies are being carried out in collaboration with Professors J. Talesnik and A.K. Sen and the summary is compiled in Professor Talesnik's report.

Research in this laboratory is continuing on the effects of PGE on skeletal muscle blood flows. Experiments were devised to study changes in blood flow during various intensities of gastrocnemius muscle stimulation of the cat under conditions of constant perfusion pressure. These studies indicate that blood vessels of exercising muscle behave somewhat like the coronary vessels in that PG appears to modulate its blood flow according to the changing metabolic demands of the tissue and it is independent of any known neurotransmitter (acetylcholine, catecholamines). PGE infusion appears to inhibit the increased blood flow which is normally observed during and after graded muscle stimulation.

Previously we showed that PGE potentiates norepinephrine (NE)-induced ^{86}Rb efflux and contractile responses in isolated mesenteric vessels. In the present work we can demonstrate that the action of NE on both ^{86}Rb efflux and contractile responses is mediated through the alpha and not the beta adrenotropic receptors and is dependent, at least in part, on the membrane potential and extracellular calcium ion concentration. The studies also show that there is a strong correlation between increase in membrane permeability and contraction in normal Krebs's solution, calcium ions are prerequisite for vascular smooth muscle contractions, and there is an alternative pathway for contraction sequence other than changes in membrane potential.

Report from the Laboratory of Professor J. Talesnik

As a result of the collaborative research project with Professor F.A. Sunahara on "The Pharmacological Study of the Regulation of the Coronary Circulation" a paper has been submitted for publication under the title "Prostaglandin-induced Inhibition of Metabolic Coronary Vasodilation." It is shown that the most important feature of the coronary response to catecholamines (noradrenaline, adrenaline, isoproterenol) whether by exogenous administration or from endogenous origin (dimethylphenylpiperazinium (DMPP)), is an overall vasodilation. This vasodilation is a response to the increased heart activity and is called "metabolically-induced coronary dilation" (MCD). PGE administered for rather prolonged periods of time produces a marked inhibition of MCD without affecting the inotropic and chronotropic effects of the catecholamines, thus establishing a clear difference between the action of PGE and beta adrenotropic receptor blocking agents like propranolol or practolol. These studies are providing us with a means of investigating the so far unknown mechanisms by which compensatory vasodilation follows the increase in heart performance as well as with a working hypothesis which could lead to the better understanding of certain types of coronary insufficiency that may produce "angina pectoris" in man.

To study the mechanisms involved in the inhibition of MCD by PGE, a collaborative work is under way with Professors A.K. Sen and F.A. Sunahara. The preliminary results will be presented at the Fifth International Congress on Pharmacology in San Francisco in July 1972. In short, it has been found that PGE inhibition of MCD corresponds with a diminished formation of 3'5' adenosine monophosphate (cAMP) when the heart is challenged by noradrenaline or Ca^{++} . On the other hand, the treatment of the heart with a phosphodiesterase inhibitor (Diazoxide), that raises the cAMP levels in the myocardium, caused marked enhancement of the MCD response at similar levels of cardiac stimulation. Thus it would appear that cAMP is a responsible mediator for the regulation of coronary blood flow.

Report from the Laboratory of Professor E. Llewellyn Thomas

See report of Institute of Biomedical Electronics.

Report from the Laboratory of Professor T. Zsoter

In the past year we continued our research on the effect of diuretics on the vessels. In previous years it was established that prolonged treatment with diuretics can inhibit norepinephrine-induced vasoconstriction. Last year the effect of diuretics on calcium kinetics in the vessels was studied with ^{45}Ca . The experiments performed with the help of Mr. K. Suffiad indicated an abnormal Ca uptake of vessels after prolonged treatment with hydrochlorothiazide. The effect of diuretics on cyclic AMP level in the vessels is studied in co-operation with Professor A.K. Sen.

In association with Professor G. Johnson and Dr. G. DeVeber at the Toronto Western Hospital, a study on the effects of renal failure on the excretion of reserpine was concluded recently. At present we are investigating the excretion of methyldopa in patients with renal failure. In other studies with Dr. S. Epstein we are investigating the effect of salbutamol (a beta adrenergic stimulator drug proposed for the treatment of bronchospasms) on peripheral circulation and particularly on the veins of man.

HONOURS

DR. H. KALANT, awarded the 1972 Jellinek Memorial Award for Research on Alcohol Problems, to be presented at the International Congress on Alcoholism and Drug Dependence, Amsterdam, September 1972.

DR. O. HORNYKIEWICZ, elected to Membership of (a) Austrian Academy of Sciences (Vienna), (b) German Academy of Natural Scientists "Leopoldina" (Halle a.S.).

DR. C.H. HOCKMAN, President-Elect of the Society for Neuroscience, Eastern Canadian Chapter.

SCHOLARLY ADDRESSES

D.E. BAILEY, "Mechanism of the biliary secretion of drugs – a study with succinyl-sulfathiazole and cholic acid," presented at the April Meeting of the Federation of American Societies for Experimental Biology, 1972.

L. ENDRENYI, "Some uses and abuses of statistics in pharmacological research," University of Western Ontario, London, Ontario, 15 October 1971; "Optimal design of experiments characterized by a single exponential function," Biophysical Society, Toronto, Ontario, 25 February 1972; "Computer programs for the analysis of drug dose-response curves and bioassays," Federation of American Societies for Experimental Biology, Atlantic City, N.J., 11 April 1972.

K.V. FLATTERY, "Brown adipose tissue, catecholamines and survival in the cold," at the International Symposium on Environmental Physiology in Dublin, June 1972.

C.H. HOCKMAN, "Limbic system modulation of respiratory neurons. Some central nervous system effects produced by Δ^1 -tetrahydrocannabinol," Department of Pharmacology, University of Ottawa, 17 March 1972; "Central nervous system modulation of brain stem mechanisms," School of Basic Medical Sciences, College of Medicine, University of Illinois, Urbana, Ill., 17 April 1972.

O. HORNYKIEWICZ, "Parkinson's disease: from brain homogenate to treatment," 3rd Meeting of the American Society for Neurochemistry, Seattle, Washington, 23 March 1972; "Brain amines in Huntington's chorea," Centennial Symposium on Huntington's Chorea, Columbus, Ohio, 28 March 1972; "Drugs acting on the central nervous system," Postgraduate day on clinical pharmacology, Toronto Western Hospital, University of Toronto, 8 April 1972.

J.C. HSIA, "Application of spin labelling technique in biological system," Department of Biochemistry and Pharmacology, Tufts University; "Single and double spin label studies of antibody active site structure," Roswell Park Memorial Institute, 1971;

"Alterations in antibody active site dimension during immune response," Department of Microbiology, Washington University and Department of Medicine, Jewish Hospital of St. Louis, 1971; "Specificity of myeloma proteins with antibody activity," Department of Microbiology, Washington University and Department of Medicine, Jewish Hospital of St. Louis, 1972; "Spin labelled hapten studies of antibody and myeloma protein active site structure" and "ESR spin labelling studies of halobacterial membrane structure," Ann. Meeting of Canadian Society of Microbiologists, 1971; "Structural differences in the active site of myeloma proteins and antibodies from the primary and secondary immune response" and "Three types of membrane ordering effects and structural requirements of cholesterol," Federation of American Societies for Experimental Biology 62nd Annual Meeting (co-worker), 1971.

J.C. HSIA, "Structural requirements of cholesterol – a spin label study," Canadian Federation of Biological Society, 1971; "Factors controlling membrane lipid bilayer thickness" (co-author), "Asymmetric cross membrane translocation of fatty amide spin label in red blood cell membrane" (co-author), Biophysical Society 16th Annual Meeting, 1972.

T. INABA *et al.*, "Drug elimination in healthy subjects," presented at the 15th Annual Meeting of the Canadian Federation of Biological Societies, Laval University, Quebec, June 1972.

Y. ISRAEL, "Alcoholism and the central nervous system," delivered to the National Council on Alcoholism, Annual Meeting, Kansas City, Mo., April 1972.

G.E. JOHNSON, "The renal excretion of doxycycline and reserpine in patients suffering renal failure," given in the Faculty of Medicine, University of Saskatchewan, 13 October 1971.

G.E. JOHNSON *et al.*, "Increased pentobarbital sleeping time after pre-exposure to cold," presented at the 15th Annual Meeting of the Canadian Federation of Biological Societies, Laval University, Quebec, June 1972.

D. KADAR *et al.*, "Drug metabolism in healthy subjects," presented at the April Meeting, Federation of American Societies for Experimental Biology, 1972.

W. KALOW, "Pharmacogenetics and drug development," presented at the B.C. Centennial Symposium on The Development and Control of New Drug Products, Vancouver, B.C., 1–2 October 1971; "Problems posed by individual variation of drug response," presented at the Chemical Institute of Canada Annual Meeting, Quebec City, Medicinal Chemistry Division, Symposium on "Drug Development in the 70's," 5–8 June 1972; "Malignant hyperthermia," presented to Los Angeles County Society of Anesthesiologists, 19 June 1972; "Variation in response to drugs used in anaesthesia," Department of Anesthesiology, University of California, Los Angeles, 19 June 1972; "Hyperpyrexia during anaesthesia," American Medical Association Annual Convention, Symposium on the Clinical Importance of Interactions, sponsored by the American Society for Clinical Pharmacology and Therapeutics, San Francisco, 22 June 1972; "Genetic factors in drug interactions," American Medical Association Annual Convention, Symposium on the Clinical Importance of Drug Interactions, sponsored by the American Society for Clinical Pharmacology and Therapeutics, San Francisco, 22 June 1972; "Drug Idiosyncrasy and pharmacogenetics," presented at Symposium on Metabolism and Disease, Food and Drug Directorate, Department of National Health and Welfare, Ottawa, Ontario, 10–11 June 1971; "Pharmacogenetics of drugs used in anaesthesia," presented at the 4th International Congress of Human Genetics, Paris, France, 6–11 September 1971.

J.M. KHANNA, "Management of alcohol toxicity," delivered at a symposium on alcoholism, sponsored by the American Society for Clinical Pharmacology and Therapeutics, Philadelphia General Hospital, January 1972.

W.H.E. ROSCHLAU, "Thrombolytic properties and side effects of brinase (fibrinolytic enzyme from *Aspergillus oryzae*) in the dog," meeting on Problems Related to Fibrinolysis, Capo Boi, Sardinia, Italy, 24–30 May 1971.

P. SEEMAN, "Immunological and drug-induced lesions," in Conference on "Recent Physical Studies of BioMembranes," Titisee, West Germany, 30 October 1971; "Cal-

cium-drug interactions," Department of Physiology, University of Manitoba, Winnipeg, 13 March 1972; "Chinese acupuncture anesthesia," North York Branson Hospital, Toronto, Ontario, 6 May 1972; "Non-specific effects of drugs on cell membranes," Department of Cell Biology, University of Toronto, 30 May 1972; "The endothelial mediation of smooth muscle responses: membrane aspects," Joint session of the Canadian Society of Clinical Investigation and the Royal College of Physicians and Surgeons of Canada Symposium, 26 January 1972; "Ultrastructure of membrane lesions," Biopsy section of the Department of Pathology, University of Toronto, 16 February 1972; "Recent advances in membrane ultrastructure," Charles H. Best Institute of Medical Research, University of Toronto, 5 May 1972; "Chain of events between the action of thyroid cell stimulation and the release of thyroid hormones," Thyroid section of the Department of Medicine, University of Toronto, 11 May 1972.

A.K. SEN, "Mechanism of ouabain inhibition of $(\text{Na} + \text{K})$ -ATPase," presented to the staff of the Department of Pharmacology, University of Vienna, Austria, July 1971; "Mechanism of NEM inhibition of $(\text{Na} + \text{K})$ -ATPase," presented to the staff and members of the Department of Biophysics, Max-Planck-Institute, West Berlin, July 1971; "Biochemical studies $(\text{Na} + \text{K})$ -ATPase," Symposium on Biochemistry, Canadian Federation of Biological Societies, Toronto, 1971; "Mechanism of the inhibition of the $(\text{Na} + \text{K})$ -ATPase enzyme system by ethacrynic acid and NEM," presented to the staff of the Department of Pharmacology, Baylor College of Medicine, Texas Medical Centre, Houston, Texas, May 1972; "Aldosterone stimulation of $(\text{Na} + \text{K})$ -ATPase," presented to the staff of the Department of Pharmacology and Toxicology, University of Texas, Galveston, Texas, May 1972.

L. SPERO, "The use of fluorescence probes in the study of membrane conformation," Department of Biological Chemistry, University of Guelph, 19 January 1972.

F.A. SUNAHARA, "Inhibition of metabolically-induced coronary vasodilation," to the Annual Meeting of the Canadian Cardiovascular Society, Saskatoon, October 1971; "Recent developments in prostaglandin research," Department of Medicine, Toronto Western Hospital, March 1972.

F.A. SUNAHARA and J. TALESNIK, "Inhibition of Metabolically-induced coronary vasodilation by prostaglandin E_1 ," at the Annual Meeting of the Canadian Cardiovascular Society in Saskatoon, 16 October 1971.

T.T. ZSOTER *et al.*, "Excretion of ^3H -reserpine in renal failure – presented to the Canadian Society for Clinical Investigation meeting held in Toronto, 25 January 1972.

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PHYSIOLOGY

Under the direction of Professor R.E. Haist

During the past year, the Department has been active in teaching and research. Members of the Department have been involved in the production of teaching films and tapes and the hope is that under the direction of Dr. R.M. Preshaw this may be expanded to include most of the core material in Physiology, at an introductory level. The number of undergraduate students still seems to be increasing, especially in the Health Sciences. The Department regrets that it does not have continuing responsibility for medical students throughout the year, although members of the Department act as chairmen and members of Systems' committees and therefore do look after medical students for specific periods. Nevertheless, it is felt strongly that some group of Faculty members should have continuing contact with and continuing responsibility for the medical students of Periods 1B and 1C. In the medical teaching Dr. R.C. Goode was Chairman of the Respiratory Committee, Dr. R.E. Haist of the Physiology Topic, Dr. J.W. Pearce of the Cardiovascular Committee, Dr. H. Sonnenberg of the Renal-Electrolyte Committee, Dr. M. Vranic of the Endocrinology Committee, and Dr. D.W. Clarke was responsible for the course in statistics.

The total number of undergraduate students in all classes given by the Department was approximately 1600, with over 900 of these in laboratory classes. The number of graduate students was 36, of whom 19 were in Ph.D. programmes; five of these students received their Ph.D degrees this year.

In the Department, the discovery of insulin by Frederick Grant Banting and Charles Herbert Best took place fifty years ago. This year a number of Department members have been actively involved in the celebrations of the 50th Anniversary of the Discovery of Insulin. We are pleased that Dr. C.H. Best, who is Professor Emeritus in Physiology and a Graduate Lecturer in the Department, has been able to play a big role in these celebrations.

We are grateful to a number of honorary members of the Department for their contributions to undergraduate and graduate teaching and other work of the Department. These are Dr. F. Coceani, Dr. D. Fraser, Dr. B.S.L. Kidd, Dr. J.M. Martin, and Dr. S.W. Kooh of The Hospital for Sick Children; Dr. A.T. Storey and Dr. B.J. Sessle of the Faculty of Dentistry; Dr. R.J. Shephard, Department of Environmental Health; Dr. W.H. Johnson and Dr. J.M. Fredrickson of the Department of Otolaryngology;

Dr. I.B. Fritz, Banting and Best Department of Medical Research; Dr. G.G. Forstner and Dr. N.E. Diamant of the Department of Medicine; Dr. G.M. Brown, Clarke Institute of Psychiatry; and Dr. J.A. Satterberg, Department of Psychology.

Many distinguished scientists visited the Department. The following gave lectures or participated in discussions: Dr. Eugene D. Jacobson, the University of Texas Medical School at Houston, Texas, "The adrenergic theory of shock revisited"; Dr. Sergio A. Bencosme, Professor of Pathology, Queen's University, Kingston, "Studies on the function of the endocrine pancreas using the morphological approach"; Dr. David Colquhoun, Department of Pharmacology, Yale University, New Haven, Conn., "Tetrodotoxin and non-myelinated nerve fibers: Affinity, rate of reaction and binding"; Dr. G. Hetenyi, Chairman, Department of Physiology, University of Ottawa, Ottawa, "Responses to hypoglycaemia and insulin in adults and newborn animals"; Dr. Horst Kern, The Rockefeller University and the University of Heidelberg, "The effect of cobalt chloride on the secretory process of the pancreatic exocrine cell"; Dr. Piero P. Foa, Chief, Division of Research, Sinai Hospital, Detroit, "Studies on insulin secretion: The roles of tolbutamide, of cyclic AMP and of insulin itself"; Dr. R.H. Lowry, Director General, Defence and Civil Institute of Environmental Medicine, Toronto, "The New Defence and Civil Institute of Environmental Medicine"; Dr. Paul Domenech, Department of Experimental Medicine, University of Chile, "Aspects of coronary blood flow utilizing a novel radioisotope, microsphere technique"; Dr. Horacio E. Cingolani, Chairman, Department of Physiology, La Platta University, Argentina, "Acid base disturbances and myocardial performance"; Dr. R.B. Stein, Department of Physiology, University of Alberta, Edmonton, "Motor control from molecules to man."

The following members of the University of Toronto gave seminars arranged by the Department: Dr. C.C. Yip, Banting and Best Department of Medical Research, "Enzymatic conversion of proinsulin to insulin"; Mr. A.M. Sun, Graduate Student, Department of Physiology, "Studies on the effects of growth hormone cyclic AMP and thyroxine on insulin synthesis"; Dr. O.V. Sirek, Professor, Department of Physiology, "The effect of hypophysectomy and of replacement therapy on the composition of canine aorta"; Dr. D.H. Osmond, Assistant Professor, Departments of Physiology and Medicine, "The kidney as an antihypertensive organ"; Dr. G. Steiner, Assistant Professor, Department of Physiology, "Lipoprotein abnormalities in experimental diabetes"; Dr. Brian Webster and Dr. A.R. Guansing, Protein Hormone Laboratory, Toronto General Hospital and Department of Medicine, "Measurement of human TSH and triiodothyronine by radioimmunoassay"; Dr. W.R. Drucker, Professor and Head, Department of Surgery, "Insulin secretion and fatty acid metabolism during haemorrhagic shock"; Dr. J. Campbell, Professor, Department of Physiology, "Effects of growth hormone treatment on insulin activity in the dog"; Dr. A.M. Rappaport, Professor, Department of Physiology, "The normal microcirculation of the mammalian liver"; Dr. M. Vranic, Associate Professor, Department of Physiology, "Do insulin and glucagon regulate glucose metabolism during exercise?"

Ph.D. Theses

G. Garay, "Studies on the mechanisms of anterior pituitary growth hormone secretion"; A. Malik, "Studies on the pulmonary circulation of intact dogs"; W. Tatton, "Alteration of lateral geniculate single unit activity by the mesencephalic reticular formation"; M. Brosnan, "Effects of hypophysectomy, pancreatectomy and hormone replacement on the composition of canine aorta"; S. Suh, "Pathogenesis of hypocalcaemia in magnesium depletion."

M.Sc. Theses

E. Coburn, "Immunofluorescent studies of pancreatic beta cells"; P. Dalziel, "The assessment and demonstration of the useful characteristics of a local radiation detector for physiological research: The measurement of potassium turnover in the liver"; U. DeBoni, "Activity of the medial geniculate body and evoked secondary discharges";

W. MacKay, "The frog muscle spindle as a tension transducer"; D.K. Mak, "Glucose turnover studies in partial hepatectomized rats"; J.K. Mills, "Hypoglycaemic activity and fate of an intermediate proinsulin (split) in the rabbit"; A. Rossman, "Ventilation and fibrinolysis"; R. Tomlinson, "An implantable middle ear hearing aid: Evaluation by cochlear potentials"; D. Arnold, "Clinical use of respiratory methods of cardiac output measurement"; A. Wielgosz, "Evaluation of cardiac function in children with heart disease by non-invasive techniques"; E. Young, "Depolymerization of macromolecular heparin in the rat."

RESEARCH

The Departmental research activities cover many fields of Physiology. The Neurophysiology and Special Sense Division has shown a vigorous development, the Endocrinology Group has been very productive, the Cardiovascular, Renal, and Gastrointestinal Sections have been doing excellent work.

In the Neurophysiology Division, in Dr. D.R. Crapper's laboratory, learning, memory and motivation have been documented in an experimental animal model of dementia, employing aluminum to induce neurofibrillary degeneration. Axoplasmic flow and protein synthesis have been measured in the presence of trace amounts of aluminum. Analysis of single neuron electrical activity at various stages in the dementia process continues.

The experimental work in Dr. J.T. Murphy's section has centred on the general subject of "How the mammalian cerebellum processes sensory information." Attention is concentrated on three complementary projects, namely: the nature of the transduction of external stimuli into impulse trains by muscle proprioceptors, the further processing of these impulse trains by cerebellar cortex, and the nature of the synaptic current response in the cerebellar cortex to these inputs. The latter is an effective measure of behaviour of discrete neuronal populations. The long-term aim of this research is to gain new knowledge about voluntary movement and its disorders.

In Dr. Peter E. Hallett's laboratory after a considerable developmental period, an active programme of research is now being carried out on the physiology of eye movements.

With Dr. R. Tasker of the Toronto General Hospital, Dr. L.W. Organ has worked on scalp-recorded averaged EEG's evoked by stimulating the spinothalamic tract during cordotomy. With Dr. A. Bernstein of the New Mount Sinai Hospital, Dr. Organ has been assessing the foetus during labour, using Doppler ultrasound. This technique was also used to investigate the pre-ejection period of the left ventricle. With Drs. J. Goodwin and J. Milligan, Women's College Hospital, work has begun on the effect of foetal stress on the pre-ejection period in the full-term foetal lamb.

In Dr. J.W. Scott's section, work has continued on the central connections of the vestibular system. Mr. U. De Boni has studied the activity of the medial geniculate body and evoked secondary discharges.

Honorary members of the Department in the Neurophysiology Division will report their research through their parent departments. They are: Dr. F. Coceani, The Hospital for Sick Children; Dr. W.H. Johnson and Dr. J.M. Fredrickson, Department of Otolaryngology; Dr. G.M. Brown, Clarke Institute of Psychiatry; Dr. J.A. Satterberg, Department of Psychology; Dr. A.T. Storey and Dr. B.J. Sessle, Faculty of Dentistry.

In the Endocrinology Division in Dr. J. Campbell's section, the permanent diabetes produced by the administration of growth hormone in dogs and the changes occurring during the induction of this metasomatotrophin diabetes have been studied with Dr. J. Pierluissi, Mr. G.R. Green, Mrs. T. Pierluissi, and Mr. R. Lee. Particular attention was given to the levels of hormones in blood. Methods for measurement of the rates of insulin secretion and utilization were developed and used. A method for determination of glucose by means of glucose oxidase and the oxygen electrode was devised.

In Dr. R.E. Haist's section, Dr. B.J. Lin and Miss Barbara Nagy studied glucose-stimulated insulin biosynthesis in isolated islets of Langerhans and found that there was a threshold for stimulation of synthesis and that the conversion of proinsulin to insulin appeared to be a limiting step. Citrate had little effect on insulin biosynthesis. Removal of calcium from the incubation medium did not affect this synthesis, but removal of magnesium caused a marked reduction. Mr. A.M. Sun investigated the site of conversion of proinsulin to insulin in the islets and found that this was in the granular fractions within Golgi or granular structures. He found also that islets from hypophysectomized rats showed less synthesis of proinsulin and insulin than those from controls and that the administration of bovine growth hormone partially restored this. Thyroxine plus GH enhanced the conversion of proinsulin to insulin. With Mrs. J. Coddling he studied the effects of partial removal of the pancreas in dogs. When more than 50 per cent of the pancreas was removed, the dogs were usually not diabetic, but did show a reduced tolerance for CHO and a reduced insulin secretion. This could be restored partially by aminophylline or by a high protein diet. Mrs. M.A. Merrilees and Mrs. J. Coddling investigated the secretion of insulin by the isolated islets and the effect of the insulin level in the incubation medium. Dr. Lin and Mrs. Merrilees have cultured islets of Langerhans of the rat for a 3-6 day period and found that insulin synthesis still occurred and could still be stimulated by glucose.

In Dr. Margaret J. Santalo's laboratory, Mr. P.N. Sachis is investigating the effects of caerulein (a decapeptide, which in structure and action mimics the gastrointestinal hormone pancreozymin) on the secretion of insulin, as judged by measurements the concentrations of insulin in pancreas and plasma. At the same time glucose and fatty acids were followed.

In the section of Professors O.V. Sirek and Anna Sirek, Mrs. Margaret E. Brosnan completed her Ph.D. thesis dealing with the effects of hypophysectomy, pancreatectomy, and of replacement therapy on the composition of canine aorta. The work indicated that (1) the composition of normal aorta varied with the segment studied; (2) the composition of the aorta was markedly affected by hormones, mainly by thyroxine and growth hormone; and (3) individual aortic segments showed differential sensitivity to a given hormone. The augmentation of the lipolytic effect of growth hormone (GH) by dihydroergotamine (DHE) was investigated *in vitro* in the isolated rat adipose cell preparation, and *in vivo*, in conscious dogs. The combination of DHE + GH is specific for the augmentation of the lipolytic effect. DHE could not be replaced by phentolamine nor could GH be replaced by ACTH, TSH, glucagon, or prolactin. Only placental lactogen was more lipolytic in the presence of DHE.

In Professor M. Vranic's section, the significance of the interplay of insulin and glucagon in regulating glucose turnover was investigated in dogs. With Mr. A.D. Cherrington, it was found that the ingestion of the amino acid arginine increased glucose turnover. This shift in fuel supply was due to the release of the pancreatic hormones insulin and glucagon and is absent in depancreatized insulin-infused dogs, but can be mimicked by concurrent infusion of insulin (biphasic) and glucagon. In collaboration with Professor G.A. Wrenshall and with Dr. R. Kawamori, it was shown that the metabolic deficiency of the depancreatized insulin-infused dog could be brought back to normal during exercise by concurrent infusions of extra insulin and glucagon. This suggests a role of the pancreatic hormones in regulating glucose turnover during exercise. In collaboration with Professor G. Steiner and Dr. A. Pol, the relationship between glucagon infusions and glucose turnover is being investigated in man in order to develop methods for the early detection of diabetes. The infusion tracer method is being validated in collaboration with Professor K. Norwich and Mrs. G. Radsuik and Mr. D. Lau, using radioactive insulin as tracer. With the assistance of Mrs. N. Kovacevic, turnover of individual fatty acids is being studied using the gas liquid chromatographic method.

Dr. Julio M. Martin's group in The Hospital for Sick Children have shown that the destruction of the ventro-medial region of the hypothalamus results in increased insulin secretion, independent of hyperphagia. *In vitro* it was found that the ventro-

lateral hypothalamus stimulates insulin secretion by isolated islets of Langerhans, and that this effect is of a humoral nature. Furthermore, the hypothalamic factor that stimulates insulin secretion was partially isolated by column chromatography and polyacrylamide gel electrophoresis. At present, efforts are directed to the purification and chemical identification of a plasma factor having the same elution characteristics as the hypothalamic material and to establishing whether or not the plasma and the hypothalamic materials are the same. With Dr. G.L. Garay, studies on the regulation of GH secretion *in vitro* were completed. It was demonstrated that an increase in intracellular concentration of cyclic AMP resulted in stimulation of both GH and TSH secretion, while hormone synthesis was not significantly changed. With Dr. N.J. Howard, studies on the mechanism of pentobarbital stimulation of GH secretion in the rat were continued.

The work of two honorary members of this Division, Dr. D. Fraser and Dr. S.W. Kooh, will be reported through their parent departments.

In the Division including Blood, Cardiovascular, and Renal Physiology, in Dr. Anne M. Hedlin's laboratory, the relation of insulin to blood fibrinolysis was studied. Investigations done in co-operation with Dr. F.C. Monkhouse are continuing on the effects of oral contraceptive agents on blood fibrinolysis and blood coagulation.

Dr. F.C. Monkhouse, with Mrs. Susan Milojevic, has continued studies on blood coagulation and fibrinolysis. It was found that isoamyl alcohol will remove all plasmin inhibitor from plasma without reducing the plasminogen or plasmin level, and, in fact, will free the bound plasmin from the inhibitor. This technique has greatly facilitated studies on the role of inhibitor in the regulation of plasmin activity in the vascular system. Studies have been carried out with Dr. R.C. Goode on the effect of voluntary overventilation on the fibrinolytic system with particular reference to the effect of changes in CO₂ levels. With the collaboration of Mr. David Purdon, Department of Biochemistry, studies have been conducted on the purification of antithrombin by the electrophoresis focusing technique.

In Dr. J. Grayson's section, with Mrs. C. Scott, Mr. M. Robertson, Miss C. Morrison, and Mr. D. Cole, three major lines of work have been pursued. The first is an investigation of the haemodynamics of the anastomosing network of coronary vessels in relation to their anatomy and in relation to the cardiac cycle and the effects of three vasodilator factors, nitroglycerin, dipyridamole, and reactive hyperaemia. The second, the effects of acute coronary artery ligation on coronary haemodynamics and also on myocardial heat production and oxygen consumption have been studied. The third, an investigation into the effect of altered properties of the vessel created by artificially induced atherosclerosis on coronary haemodynamics has been carried out and the further effect of atherosclerosis on experimental infarction studied. This phase of the work also involved pathological follow-up carried out by Dr. Fletch and Dr. Silver. It is hoped to compare physical changes as indicated by pathology with physiological changes.

In Dr. J. Hunter's laboratory, preliminary work has been done on the effects of certain prostaglandins in the rat during hypothermia. The results obtained with PGA₁ and PGE₁ have been almost identical. Serum potassium levels in treated animals were higher than in untreated ones at 18°C and seemed more like the control values at 37°C. There appeared to be a beneficial effect on heart rate with treatment.

In Dr. D.H. Osmond's group, studies have continued on phospholipid and phospholipase activity in relation to renin inhibition and have found that, even if lysophosphatidylethanolamine is a physiological renin inhibitor, it is unlikely that the kidney is a prime regulator of such renin inhibitory capacity. With Miss P. McFadzean, a radioimmunoassay for angiotensin I has been developed. In other studies, the cause of the fall in blood pressure in the third trimester in pregnant animals with renal hypertension, is being sought. With Miss L.J. Boorman, studies are being conducted on homogenates of ischaemic and contralateral kidneys in hypertensive rats as well as in plasma of hypertensive rats and controls in an attempt to discover new components of hypertension.

Dr. J.W. Pearce, together with Dr. H.H. Bengel, Dr. E. Houttuin, Mr. U. Ackermann, Miss D. Barker, and Mr. A.T. Veress, has continued studies of sensory and effector mechanisms of body fluid *volume* regulation. It has been demonstrated that a blood volume increase leads to a rise in venous pressure which is corrected by the renal excretion of salt and water which comes in large part from the interstitial fluid compartment. The correction of the elevated venous pressure occurs in spite of a residual blood volume increase. The effector mechanism of the renal response is complex and has been demonstrated to include a humoral component in the rat and in the dog. In addition, there is a nervous component which appears to operate synergistically with vascular pressure increase at the renal level. The response is influenced to an important degree by the initial haematocrit and plasma protein composition, implying an interaction between the control of blood volume and blood composition. Other experiments are in progress to identify abnormalities of volume regulation leading to high blood pressure.

In Professor A.M. Rappaport's section, research on the effects of hepatic arterial ischemia as compared to portal venous ischemia on survival and metabolism of partially depancreatized dogs has continued, with Mrs. A. Kalnins, Mr. G. Empey, Mr. J. Schneiderman, and Mr. R. Khosla. The changes in fat metabolism immediately following ligation of the hepatic artery in dogs were studied in collaboration with Dr. Felts and Dr. Mayes of the Banting and Best Department of Medical Research. In co-operation with Dr. J. Grayson, a series of partially depancreatized dogs having the remainder of their pancreas explanted under the skin of the abdomen were given an atherogenic diet. Although the onset of diabetes was not advanced, the atherogenic effect was enhanced. The research and teaching film "Normal Microcirculation of the Mammalian Liver" was completed in co-operation with Professor N. Joy of the Department of Art as Applied to Medicine.

In the laboratory of Dr. H. Sonnenberg, investigations on the localization of intrarenal transport alterations due to blood volume expansion using micropuncture techniques were carried out and the effect of chronic vena caval constriction on "volume natriuresis" studied. The effect of different levels of hydration on the renal response to blood volume expansion has been observed and, with Dr. J.W. Pearce, an investigation of transferred natriuresis of blood volume expansion in pairs of cross-circulated rats has been carried out.

One honorary member of this Division, Dr. B.S.L. Kidd, will report through his parent department.

Dr. R.M. Preshaw has worked on vagal stimulation and gastrin release (with Mr. B. Tepperman and Mr. J.H. Walsh), the control of pancreatic secretion by intestinal hydrogen ions, and measurement of serum gastrin in man by immunoassay. A service is now available to interested clinicians for assistance in diagnosis of gastrin-secreting tumours of the pancreas.

Two honorary members of the Department, Dr. G.G. Forstner and Dr. N.E. Diamant, will report through their parent department.

In the Respiratory Section, Dr. R.C. Goode, in co-operation with Dr. J. Duffin, Anaesthesia, carried out breath-by-breath monitoring of respiration in volunteers. The experiments were designed to measure the neural drive component of breathing during exercise and during sensory stimulation. The study was particularly concerned with the relation between the phase of respiration in which the exercise command or sensory stimulus was given and the effect on the same inspiration or expiration. In this way it was hoped to demonstrate that links exist between the reticular formation and respiratory neuronal elements in man. Two clinical studies in conjunction with Drs. S. Galloon and J. Duffin of the Department of Anaesthesia, are starting on the effects of ketamine on the ventilatory response to CO₂ breathing and the effects of anaesthesia on the drive to ventilation mediated by the peripheral chemoreceptors. With Dr. F.C. Monkhouse, studies of the effect of overventilation on the fibrinolytic system have been carried out.

In Dr. D.W. Clarke's section, studies on the metabolism of cerebral and spinal

cord tissues have continued. Factors which can affect the output of free fatty acids from these tissues have been investigated, in connection with the overall objective of studying demyelinating processes.

HONOURS

C.H. BEST, First recipient of Brazil Biennial Award of the São Paulo Biennial Foundation; Recipient of Gairdner International Award; Honorary Degree of Doctor of Science from Laurentian University; Doctor of Medicine from the University of Ottawa; Doctor of Philosophy from the Hebrew University of Jerusalem; elected Honorary Member of the Hamilton Academy of Medicine; of the Alumni Association of the University of Ottawa; and Honorary President of the Harvard-Joslin-Buenos Aires Course on Diabetes Mellitus; reappointed Consultant, Department of Physiology, The Hospital for Sick Children, Toronto; and reappointed to serve an additional two years on the WHO Expert Advisory Panel.

J.T. MURPHY, Elected Secretary-Treasurer of the Neuroscience Society, Eastern Canada Chapter; Visiting Professor of Neuroscience, University of Ottawa; elected Fellow of Eastern American Society of Electroencephalographers.

SCHOLARLY ADDRESSES

C.H. BEST, "Summer of 1921," introductory lecture at 50th Anniversary Insulin Symposium held by Eli Lilly and Company, Indianapolis; "The Discovery of Insulin," at the Postgraduate Course of The American College of Physicians, Indiana University School of Medicine; "The History of Insulin," at the Hebrew University of Jerusalem; "Experimental and Clinical Aspects of Insulin," at the Hadassah Hospital, Jerusalem; "Present Position of Insulin," at the Beilinson Hospital, Petah-Tikva, Tel Aviv; "Recollections of the Early Days of Insulin," at the New York Diabetes Association 19th Annual Symposium; "Perspectives: Past and Future," at the 50th Anniversary Symposium on INSULIN ACTION, University of Toronto; "Reminiscences of 1921," Gairdner Foundation Lecture; "The History, the Discovery and the Present Position of Insulin," Pontifical Academy of Sciences, Rome; "Philosophy and Outlook," at Symposium dedicating the City of Hope National Medical Center, Duarte, California; "50 Years of Insulin," the 5th Annual Ernest C. Janes Memorial Lecture, Hamilton Academy of Medicine; "Insulin and Diabetes after 50 Years," before Medical Faculty, University of Rio de Janeiro.

J. CAMPBELL (with Dr. J. Pierluissi), "Determination of glucose by measurement of oxygen tension in glucose oxidase solution," Toronto Diabetes Association, Scientific Day, May 1972.

J. GRAYSON (with M.A. Robertson), "Metabolic parameters in myocardial ischaemia," xxv International Congress of Physiological Sciences, Munich, 1971; "Hemodynamic consequences of age and atheroma," International Symposium on Atherosclerosis, Ontario Heart Foundation, Toronto 1971.

J. GRAYSON (with C. Scott, B. Winchester, and M. Robertson), "Effect of nitroglycerine and dipyridamole in normal and atherosclerotic dogs," Toronto Clinical Society, 1971.

J. GRAYSON (with A.O. Durotype), "Effect of environmental temperature on gastrointestinal heat production," Departments of Physiology, University of Ibadan and University of Toronto. International Symposium on Bioenergetics and Temperature Regulation, Dublin, 1971.

P.E. HALLETT, Invited lectures on various aspects of "The Physiology of Night Vision," given to the Department of Physiology, University of Ottawa; Department of Psychology, York University; School of Optometry, University of Waterloo; Department of Physiology, University of Edmonton; Lake Ontario Vision Establishment (LOVE) 1972 Conference at Niagara.

B.J. LIN (with R.E. Haist), "A preliminary note on the effect of some modifiers

of insulin release on the biosynthesis of insulin," Toronto Diabetes Association, Annual Scientific Meeting, May 1972.

J.M. MARTIN, "Hypothalamic control on insulin secretion," Symposium on Obese Hyperglycaemic Mice," Department of Biochemistry, Imperial College of Science and Technology, London, July 1971; "Hyperinsulinism and Obesity," New York Medical College, January 1972.

J.T. MURPHY, "The cerebellum as a motor control system," to the Montreal Neurological Institute, McGill University, February 1972; "The neurophysiology of perception," to the graduate course in physical and occupational therapy, Toronto Western Hospital, University of Toronto, November 1971; "Muscle spindle receptor mechanisms," to the 1st Annual Meeting of the Society for Neurosciences, October 1971; "Two-stage integration of synaptic digital inputs by cerebellar Purkinje cells," to Winter Conference on Brain Research, Vail, Colorado, January 1972; "The amygdalar control of hypothalamic output," to the Symposium on Neurobiology of the Amygdala, Bar Harbor, Maine, June 1971.

L.W. ORGAN (with R.R. Tasker), "Stimulation mapping of the human brainstem during stereotaxic surgery," to the Canadian Society for Clinical Investigation, Toronto, January 1972.

L.W. ORGAN (with R.R. Tasker and R.J. Evans), "Experience with 100 percutaneous cordotomies," to the Royal College of Physicians and Surgeons, Toronto, January 1972.

L.W. ORGAN (with R.R. Tasker), "Percutaneous cordotomy. Physiological identification of target site," to the American Association of Neurological Surgeons, Boston, April 1972.

D.H. OSMOND, "Frontiers of the renin-angiotensin system and some clinical implications," to the Toronto Western Hospital Rounds, February 1972; "Activity and positional specificity of a rat plasma phospholipase on phosphatidylethanolamine," to the Clinical Research Society of Toronto, Annual Meeting, March 1972; "The renin-angiotensin system in relation to hypertension," to the Grand Rounds, Wellesley Hospital, March 1972; "Mechanisms for renin release: Implications for clinical diagnosis of renal hypertension," to Rounds, St. Michael's Hospital, Toronto, May 1972.

A.M. RAPPAPORT, "The acinar concept of hepatic structure" (illustrated by film: Microcirculation of Normal Mammalian Liver) to Anatomical Institute, University of Tubingen, West Germany, July 1971; "The functional concept of liver structure, its relation to hepatic microcirculation," to Department of Surgery and of Internal Medicine, University of Wurzburg, West Germany, August 1971; "Changes in the hepatic microcirculation leading to portal hypertension in rats drinking alcohol and eating a protein deficient diet" (film illustrated), to a Symposium on Alcoholic and Liver Disease, 41st Annual Meeting of the Royal College of Physicians and Surgeons, Toronto, January 1972; "Hepatic structure and microcirculation" (illustrated by film: Microcirculation of Mammalian Liver), to Division of Gastroenterology, Royal Victoria Hospital, Montreal, March 1972.

ANNA SIREK, "Effect of dihydroergotamine and human chorionic somatomammotropin on plasma free fatty acids in hypophysectomized dogs," to the Toronto Diabetes Association and to the 4th International Congress of Endocrinology, Washington, D.C.

O.V. SIREK, "Oral hypoglycaemic agents" and "The effect of hypophysectomy and replacement therapy on the composition of canine aorta," to the Division of Research, Sinai Hospital, Detroit; "Effect of hypophysectomy and growth hormone treatment on the composition of canine aorta," to 2nd International Symposium on Early Diabetes, Curacao, N.A. and to 4th International Congress of Endocrinology, Washington, D.C.

M. VRANIC, "The significance of the interplay between insulin and glucagon in regulation glucose turnover," to Department of Physiology and Biophysics, Hahnemann Medical College and Division of Research, Lankenau Hospital, Philadelphia, May 1972; Joslin Clinic, Boston, April 1972; Institut de Biochimie Clinique, Université de

Genève, July 1971; Division of Endocrinology and Metabolism, Department of Internal Medicine, Ann Arbor, February 1972; Department of Physiology, University of Western Ontario, London, October 1971.

PUBLICATIONS

- Ackermann, U. and Sonnenberg, H. "Body Fluid Distribution Changes following Blood Volume Expansion in Rats" (*Federation Proceedings*, vol. 31, 1972, p. 379) (abstract)
- Akerblom, H.K., Martin, J.M., Garay, G.L. and Moscarello, M.A. "Experimental Hyper-somatotropism. II. Metabolic Effects in Rats bearing the MtT-W15 Tumor" (*Hormone and Metabolic Research*, vol. 4, 1972, p. 15)
- Bengele, H.H. "Renal Response to Blood Volume Expansion in Conscious Rats with Acute, High Spinal Cord Transection" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 138, 1971, pp. 696-701)
- Bouman, P.R. and Martin, J.M. "Studies on the Cause and Significance of Hyperinsulinism in Hypothalamic Hyperphagia"; in *4th International Conference on Regulation of Food and Water Intake*, Cambridge, p. 21, Aug. 1971 (abstract)
- Brosnan, M., Sirek, O.V., and Sirek, A. "Effects of Hypophysectomy on the Composition of Canine Aorta" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 26) (abstract)
- "Effect of Hypophysectomy and Growth Hormone Replacement on the Composition of Canine Aorta" (*Biochemical Journal*, vol. 125, 1971, p. 116) (abstract)
- Campbell, J. and Pierluissi, J. "Determination of Glucose by Measurement of Oxygen Tension in Glucose Oxidase Solution" (*Canadian Federation of Biological Societies*, vol. 15, 1972, p. 237)
- Cherrington, A.D. and Vranic, M. "The Effects of Arginine, Insulin and Glucagon on Glucose Turnover in Dogs" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 19) (abstract)
- "Role of Glucagon and Insulin in the Control of Glucose Turnover" (*Metabolism*, vol. 20, 1971, p. 625)
- Cherrington, A.D., Kawamouri, R., and Vranic, M. "Role of Insulin and Glucagon in the Response of Glucose Turnover to Arginine" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 15, 1972, p. 388) (abstract)
- Durotoye, A.O. and Grayson, J. "Heat Production in the Gastrointestinal Tract of the Dog" (*Journal of Physiology*, vol. 214, 1971, pp. 417-27)
- Haist, R.E. "Functions of the Islets of Langerhans" (*Canadian Medical Association Journal*, vol. 105, 1971, pp. 956-61)
- "Factors affecting the Actions of Insulin" (*Excerpta Medica*, International Congress Series, vol. 231, 1971, pp. 485-91)
- Hallett, P.E. "Disturbances of Rod Threshold Forced by Briefly Exposed Luminous Lines, Edges, Disks and Annuli" (*Journal of Physiology*, vol. 215, 1971, pp. 449-76)
- "Rapid Changes and Hysteresis in Spatial Integration for Human Rod Vision" (*ibid.*, pp. 433-47)
- "The Physiology of Vision"; in *Modern Ophthalmology*, ed. A. Sorsby, vol. 1, pp. 203-330, 1972
- "Rapid Changes and Hysteresis in Spatial Integration for Human Rod Vision" (*Ophthalmology Digest*, vol. 34, 1972, p. 35)
- Hedlin, A.M., Monkhouse, F.C., and Milojevic, S.M. "A Comparative Study of Fibrinolytic Activity in Human, Rat, Rabbit and Dog Blood" (*Canadian Journal of Physiology and Pharmacology*, vol. 50, 1972, p. 11)
- Hotta, N., Sirek, O.V., and Sirek, A. "Studies on the Interaction between Growth Hormone and Dihydroergotamine in Adipose Cells. I. The Lipolytic Effect of Dihydroergotamine; II. Augmentation of the Lipolytic Response" (*Hormone and Metabolic Research*, vol. 3, 1971, pp. 161-6; 321-5)
- Idahl, L.A. and Martin, J.M. "Stimulation of Insulin Release by a Ventrolateral Hypothalamic Factor" (*Journal of Endocrinology*, vol. 51, 1971, p. 601)
- Ito, A., Martin, J.M., Grindeland, R.E., Takizawa, S., and Furth, J. "Mammotropic and Somatotrophic Hormones in Sera of Normal Rats and in Rats bearing Primary and Grafted Pituitary Tumors" (*International Journal of Cancer*, vol. 7, 1971, p. 416)
- Martin, J.M. and Bouman, P.R. "Effect of Ventromedial Hypothalamic Lesions on Insulin Secretion"; in *12th Fed. Verg. Biol.*, Rotterdam 1971, p. 221) (abstract)
- Merrilees, M.A. and Haist, R.E. "Insulin-like Effects of Phospholipase C in Diaphragm Muscle" (*Canadian Journal of Physiology and Pharmacology*, vol. 50, 1972, pp. 367-70)
- Monkhouse, F.C., Milojevic, S., and Schmitt, A. "The Physiological Importance of Antithrombin" (*Thrombosis et Diathesis Hemorrhagica*, supp. 46, 1971, pp. 201-8)
- Murphy, J.T. and Sabah, N.H. "A Superposition Model of the Spontaneous Synaptic Excitation of Cerebellar Purkinje Cells" (*Biophysical Journal*, vol. 11, 1971, pp. 414-28)
- "Cerebellar Purkinje Cell Responses to Afferent Inputs. I. Climbing Fiber Activation; II. Mossy Fiber Activation" (*Brain Research*, vol. 25, 1971, pp. 449-67, 469-82)

- Murphy, J.T. (with Eccles, J.C., Faber, D.S., Sabah, N.H., and Taborikova, H.) "Afferent Volleys in Limb Nerves Influencing Impulse Discharges in Cerebellar Cortex. I. In Mossy Fibers and Granule Cells; II. In Purkinje Cells" (*Experimental Brain Research*, vol. 13, 1971, pp. 15-35, 36-53)
- "Investigations on Integration of Mossy Fiber Inputs to Purkinje Cells in the Anterior Lobe" (*ibid.*, pp. 54-76)
- Murphy, J.T., Davison, E.J., Johnson, F., and Kwan, H.C. "Quantitative Analysis of Mechanoreceptor Discharge Patterns in Response to Changes in Muscle Length" (*Proceedings of the Society for Neuroscience*, vol. 1, 1971, p. 154)
- Murphy, J.T. (with MacKay, W.A., Johnson, F., and Kwan, H.C.) "Frog Muscle Spindle Impulse Responses to Whole Muscle Inputs" (*Brain Research*, vol. 35, 1971, pp. 236-9)
- Norwich, K.H. "Rates of Protein Synthesis by Deconvolution" (*Biochemical Journal*, vol. 126, 1972, pp. 1124-6)
- Norwich, K.H. and Hetenyi, G. "Basic Studies on Metabolic Steady State. Incompletely Mixed Systems" (*Bulletin of Mathematical Biophysics*, vol. 33, 1971, pp. 403-12)
- Osmond, D.H. "Lysophosphatide 'Renin Inhibitor': Significance of its Formation in Plasma of Anephric Humans and Rats" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 102) (abstract)
- Osmond, D.H., Holub, B.J., and Ross, L.J. "Activity and Positional Specificity of a Rat Plasma Phospholipase on Phosphatidylethanolamine" (*Federation Proceedings*, vol. 31, 1972, p. 526) (abstract)
- Osmond, D.H. and McFadzean, P.A. "Biochemical Study of Human and Animal Renins and of Rat Renin Substrate" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 103) (abstract)
- Osmond, D.H., Tinker, D.O., Ross, L., and Schwartz, H. "Blood Pressure Responses to Angiotensin and Renin after I.V. Infusion of Renin 'Preinhibitor' and Other Phospholipids" (*Federation Proceedings*, vol. 30, 1971, p. 449) (abstract)
- Pearce, J.W. "Blood Volume Regulation and the Dynamics of the Low Pressure Vascular System" (*Proceedings of the International Union of Physiological Sciences*, xxv Congress, vol. 8, 1971, pp. 81-2)
- "Science Policy and the Support of Health Research in Canada: A Synopsis of Structure and Function" (*Physiology Canada*, vol. 3, 1972, pp. 57-64)
- Pearce, J.W. and Veress, A.T. "Further Evidence for a Non-adrenal Humoral Component of the Volume Natriuretic Mechanism in the Rat" (*Federation Proceedings*, vol. 31, 1972, p. 343) (abstract)
- Pierluissi, J. and Campbell, J. "Insulin Secretion and Levels in Metasomatotrophin Diabetes and its Induction" (*Federation Proceedings*, vol. 31, 1972, p. 243) (abstract)
- "Measurement of Rate of Utilization of Insulin in Normal and Metasomatotrophin-diabetic Dogs" (*Canadian Federation of Biological Societies*, vol. 15, 1972, p. 384)
- Preshaw, R.M. "Pancreatic Stimulation by Carboxylic Acids in the Canine Intestine" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 14, 1971, p. 63)
- Rappaport, A.M. "Normal Hepatic Microcirculation" (*Proceedings of the International Union of Physiological Sciences*, xxv International Congress, Munich, vol. 9, 1971, p. 637) (abstract)
- Rappaport, A.M. and the Hepatic Microcirculatory Unit "Normal Microcirculation of the Mammalian Liver" illustrated by film (*Annual Meeting, American Microcirculatory Society*, Atlantic City, Apr. 1972) (abstract)
- Rappaport, A.M., Kawamura, T., Davidson, J.K., Lin, B.J., Ohira, S., Zeigler, M., Coddling, J.A., Henderson, J., and Haist, R.E. "Effects of Hormones and of Blood Flow on Insulin Output of Isolated Pancreas *in situ*" (*American Journal of Physiology*, vol. 221, 1971, p. 343)
- Sirek, O.V. and Sirek, A. "Anterior Pituitary Growth Hormone, its relationship to Insulin and Diabetes" (*Modern Medicine*, vol. 27, 1972, pp. 12-14)
- "Plasma Glycoproteins and Diabetes Mellitus in Man"; in *Handbook of Diabetes Mellitus*, vol. 2, ed. E.F. Pfeiffer, pp. 317-30. München: Lehmanns Verlag 1971
- Sirek, O.V., Hotta, N. and Sirek, A. "Acute Metabolic Effects of Growth Hormone and their Relationship to Insulin"; *Proceedings of the 7th Congress of the International Diabetes Federation*, Amsterdam, ed. R.R. Rodriguez and J. Vallance-Owen, pp. 175-83. Excerpta Medica Foundation 1971
- Sirek, O.V. and Gorman, C.K. "Fifth Canadian Workshop in Diabetes: Papers on the Islets of Langerhans, Hormones and Actions" (*Canadian Medical Association Journal*, vol. 105, 1971, pp. 995-8)
- Sonnenberg, H. "The Renal Response to Blood Volume Expansion in the Rat: Proximal Tubular Function and Urinary Excretion" (*Canadian Journal of Physiology and Pharmacology*, vol. 49, 1971, pp. 525-35)
- Vranic, M. "Insulin and Glucagon: A Dual Feedback System to Control Glucose Homeostasis"; in *Insulin Action*, ed. I.B. Fritz, ch. 21, p. 529. New York, London: Academic Press 1972
- Vranic, M. and Cherrington, A.D. "The Role of Glucagon and Insulin in the Control of Glucose Turnover in Dogs" (*Federation Proceedings*, vol. 30, 1971, p. 193) (abstract)

- Vranic, M., Cherrington, A.D., and Wilkins, J. "Effects of Arginine on Glucose Turnover" (*Federation Proceedings*, vol. 31, 1972, p. 263) (abstract)
- Vranic, M., Fono, P., Kovacevic, N., and Lin, B.J. "Glucose Kinetics and Fatty Acids in Dogs on a Matched Insulin Infusion after a Glucose Load" (*Metabolism*, vol. 20, 1971, p. 954)
- Vranic, M., Kawamori, R., Cherrington, A.D., and Wrenshall, G.A. "Effects of Insulin and Glucagon on Glucose Turnover in Depancreatized Dogs during Running" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 15, 1972, p. 383)
- Wilson, R.B. and Martin, J.M. "Further Modification of a Technique for Radioimmunoassay of Insulin" (*Canadian Journal of Comparative Medicine*, vol. 35, 1971, p. 298)
- Wilson, R.B., Martin, J.M., Kelly, H., and Newberne, P.M. "Plasma and Pancreatic Insulin Concentrations in Adult Squirrel and Rhesus Monkeys" (*Diabetes*, vol. 20, 1971, p. 151)

PREVENTIVE MEDICINE

Under the direction of Professor R.W. Morgan

For the Department of Preventive Medicine, 1971/2 saw the arrival of the current Chairman, Dr. Robert W. Morgan, in July of 1971. Although handicapped by a severe staff shortage, the Department did manage to achieve a number of objectives during the year. It is probably best thought of as a period of review and revision of basic policies, establishment of priorities for staff recruitment, and beginning of that process, combined with the continuation of major teaching responsibilities. Major policy changes included: (1) abandonment of the "component" system of appointments so that all appointments to the joint department are joint appointees to both Preventive Medicine and Hygiene; (2) establishment of a vigorous research programme; (3) major modification of the previous policy of "teaching the teachers" instead of teaching the students. Current policy concentrates on *student* teaching.

TEACHING

Undergraduate medical teaching was restructured this year to include more emphasis on environmental health and demography. Most teaching occurred in Period II, and there were about 50 per cent more teaching hours than in the previous year. The Department participated both in time devoted to Preventive Medicine and within the other systems.

There was limited teaching at the graduate level. The Chairman gave two sessions on epidemiologic methods to ophthalmology residents, and assisted in the supervision of the research project of one of those residents. There was also participation in the School of Hygiene epidemiology seminars and direct supervision of one student project in the area of cancer epidemiology.

Both the Chairman and Dr. S.C. Best taught for the Department of Behavioural Science.

Activities other than the numerous administrative ones included participation in the general academic life of the community. Three guest lectures were sponsored and speakers provided for a number of seminars in the field of epidemiology.

RESEARCH

Research has been of three types: independent, collaborative, and consultative. The Chairman has continued projects in the field of glaucoma and breast cancer that had been initiated at the University of British Columbia. Also, new projects are funded or under way in the areas of Air Pollution, Bladder Cancer, and Mental Health. The Chairman has served as a consultant to a number of individual investigators, especially in the area of cancer and ophthalmic research. He has also acted as a reviewer for the

Ontario Cancer Treatment and Research Foundation, the Medical Research Council, Federal Department of Health and Welfare, and some smaller organizations.

SCHOLARLY ADDRESSES

R.W. MORGAN, "Evaluation of Early Intervention: The B.C. Cervical Cytology Program," Canadian Society for Clinical Investigation, Royal College of Physicians and Surgeons Symposium, Royal York Hotel, 26 January 1972; "Refractive Problems in Eskimos," Canadian Ophthalmological Society, Annual Meeting Symposium on Arctic Ophthalmology, June 1972.

STAFF CHANGES

Academic

The Chairman, Dr. R.W. Morgan, arrived in July 1971. The Department was proud to have Dr. H.S. Gear, Professor, serve as Acting Associate Dean for Postgraduate Medical Education for a large portion of the academic year, although this greatly limited his activities within the Department. Dr. D. Warren, who in the previous year had shifted his academic activities back to Environmental Health, resigned his full-time appointment in October to become a medical director of Occidental Life of Canada. Dr. Stanley C. Best joined the Department as Associate Professor (major part-time) on 1 January, and has had considerable influence on the teaching programme. Dr. Peter Morgan began work on 1 May as Assistant Professor. He has the Federal Research Position in Epidemiology and Biometry for the Department. A number of full-time staff have been recruited to begin work on 1 July 1972.

There were a number of cross-appointments for persons from other departments in both the School of Hygiene and Faculty of Medicine made during the year, and the initiation of some cross-appointments for the Chairman to other Departments.

Non-Academic

The Departmental Secretary, Miss J. Thurston, and the part-time secretary, Mrs. I. Singer, remained with the Department. There have been a number of research assistants with the Department for varying periods.

PUBLICATIONS

- Morgan, R.W. "Medical Research using Hospital Statistics"; in *Medical Statistics – Conception to Presentation*, pp. 20–32. Vancouver: British Columbia Hospitals Association, Mar. 1972
- "Open-Angle Glaucoma: An Epidemiologist's View" (*Canadian Journal of Ophthalmology*, vol. 7, Jan. 1972, pp. 75–9)
- "Prevention, Anyone?" (editorial) (*Canadian Journal of Public Health*, vol. 62, 1971, pp. 361–2)
- Morgan, R.W. (with MacMahon, B., Cole, P., Brown, J.B., Tong Ming Lin, and Ngai-Chen Woo) "Oestrogen Profiles of Asian and North American Women" (*Lancet*, vol. 2, Oct. 23, 1971, pp. 900–2)
- Morgan, R.W. (with Rock, W.J. and Drance, S.M.) "A Modification of the Armaly Visual Field Screening Technique for Glaucoma" (*Canadian Journal of Ophthalmology*, vol. 6, Oct. 1971, pp. 283–92)

PSYCHIATRY

Under the direction of Professor R.C.A. Hunter

EDUCATION

The Department provided educational opportunities for undergraduate and postgraduate medical students, graduate students, and a variety of mental health professionals. There was also an intensification of our efforts in continuing medical education

as well as education of the lay public in matters pertaining to the broad area of mental health and illness.

Nineteen postgraduate students were awarded the Diploma in Psychiatry, and seven the Diploma in Child Psychiatry.

CLINICAL FACILITIES

In the pursuit of their academic goals, the Department's clinical facilities have had an eventful year. This report can emphasize only a few aspects of this vigorous development. Most interesting has been the augmentation of clinical resources and their redirection into community involvement and care. Partly in connection with this has gone the continuing growth of clinical, evaluative, and operational research.

Two affiliated hospitals, the New Mount Sinai Hospital and the Queen Street Mental Health Centre, have undergone major reorganizational changes contingent upon occupying new buildings. The Toronto General Hospital Department of Psychiatry has strengthened its acute service, ambulatory care service, and its consultation and liaison services: links with the community are also being fostered and forged.

All the hospitals, but Sunnybrook Hospital's Department of Psychiatry in particular, are providing increased resources and co-operation for the Family Practice Department, and have established consultation and clinic facilities for adolescents and disturbed families in the North York area.

Ambulatory care and community consultation services have been added or strengthened in the departments of the Toronto Western Hospital, St. Michael's Hospital, and Wellesley Hospital. Particular mention should be made of the Toronto Western Hospital's attempts to assist in the area of drug abuse, especially in the city's young people, and the efforts of St. Michael's to extend the use of group treatment techniques and to effectively utilize paramedical personnel.

During the year, the department of The Hospital for Sick Children occupied new and improved quarters, and stepped up their community liaison services through emphasis on pre-school programmes, the screening programme for Tay-Sach's disease, and the Sioux Lookout Project.

The Hincks Treatment Centre continues its vigorous efforts to provide services for emotionally disturbed adolescents.

The Clarke Institute is involved in an ever widening range of services to the community, and plans have been completed for a reorganization which will better subserve these evolving goals.

These developments have greatly contributed to the Department's primary role as a modern educational and research resource, and students at all levels have benefited from them.

STAFF

It is with deep regret that the death of Professor P.M. Yap must be recorded.

Professor A.B. Stokes, who directed the affairs of this Department for nineteen years, retired and became Professor Emeritus. Professor John Dewan also reached retirement age. The contributions of both these men to the firm foundations on which the Department now rests can scarcely be overestimated.

RESEARCH

Again in 1971-2, we have seen considerable growth of research endeavour in this Department. This is especially evident at the clinical level where substantially more clinical investigations have begun.

In a 1971 survey, the Research Committee of this Department reported 99 investigative projects underway. The number this year is higher, although we do not yet have complete information.

For this report, it is obviously not possible to list all projects. Where several projects are being carried out under one senior investigator, in one investigative area, or around one scientific question, it has been relatively easy to condense the project information we have into a general description of the research being done. However, there also exist between forty and fifty individual projects which defy summarization in this way; such individual projects are specifically noted in this report only where the project is nearing completion, and where the investigator reports to us that he appears to have significant results.

Current research is described under the headings Neuroscience, Social and Psychological Studies, Psychopharmacology, Adult Psychiatry, and Child Psychiatry.

Neuroscience

At the Clarke Institute of Psychiatry, Dr. G.M. Brown continues his studies of neuro-endocrinological aspects of stress adaptation, with particular attention being given to growth hormone.

Dr. O. Hornykiewicz continues his studies on dopamine, and has also just completed a pilot study of the brains of suicides which he finds show significant alterations in 5-hydroxytryptamine and its principal metabolite.

Dr. H.C. Stancer continues his long-term investigations into alterations in biogenic amines in recurrent affective disorder.

Dr. L.B. Raschka continues his study of the rheoencephalogram.

Several psychophysiological studies are underway at the Clarke Institute, including an investigation of the effect of gamma-hydroxybutyrate on sleep in depressed patients as well as studies on evoked potentials as electroencephalographic markers of central information processing.

At the Toronto General Hospital, neuropharmacological studies into the mechanisms of action of psychotomimetic drugs continue under Dr. P. Brawley. This laboratory also continues its studies of habituation of central physiological processes, and its studies on the applicability of fine-grained computer analyses of the electroencephalogram in psychiatry.

Social and Psychological Studies

At the Clarke Institute, Dr. D. Paitich continues his studies on the Wechsler Adult Intelligence Scale. He has also elaborated other psychological measures for clinical use.

Dr. K.W. Freund continues his studies into disturbances of gender identity and sexual behaviour.

Psychotherapeutic process, familial apperception, and the behavioural correlates of psychiatric illness are other subjects under investigation.

At the Toronto General Hospital, a behavioural rating scale for use by psychiatric nurses has been developed. In several centres, the efficacy of behavioural therapy is under investigation.

At the Clarke Institute, the East York project which investigated certain social correlates of psychiatric illness, help-seeking, and treatment is at the stage of final data analysis.

Psychopharmacology

Controlled, double-blind trials of antidepressants are underway at St. Michael's, the Toronto General, the Toronto Western, and Sunnybrook Hospitals. A study of a relatively recently developed phenothiazine in the treatment of obsessional illness is underway at the Clarke Institute.

At the New Mount Sinai Hospital, Dr. E. Brown is investigating physiological, chemical, and psychological effects of L-Dopa administered to patients with Parkinsonism, in collaboration with Dr. G.M. Brown's laboratory at the Clarke Institute.

Controlled, double-blind trials of a new benzodiazepine are beginning at the Toronto General Hospital and at the Clarke Institute.

Dr. E. Kingstone continues his studies on lithium at Sunnybrook Hospital.

Adult Clinical Psychiatry

Several psychosomatic studies are being carried out, including investigations of premenstrual tension, acute myocardial infarction, pseudo-anginal chest pain, psychogenic regional pain, and obesity. These studies are based in New Mount Sinai Hospital, the Toronto General Hospital, the Toronto Western Hospital, and the Clarke Institute.

Group processes in psychiatric in-patients are under study at St. Michael's Hospital by Dr. D. Sherret.

Dr. Mary Seeman of the Toronto Western Hospital is studying the language of psychotic patients.

Gilles de la Tourette syndrome is being studied at the Clarke Institute, with reference to uric acid metabolism.

Child Psychiatry

Dr. J.M. Berg continues his genetic and clinical studies at the Mental Retardation Centre, where Dr. A. Bonkalo also is studying behaviour patterns in retardates.

Studies of treatment efficacy are underway at the Hincks Treatment Centre, Thistletown Regional Centre, and The Hospital for Sick Children.

The parents of psychotic children are the object of a study at the Clarke Institute.

Certain social parameters of adolescent behaviour are under study by Dr. S. Levine at The Hospital for Sick Children.

Summary

This brief description of research presently going on in the Department of Psychiatry is necessarily condensed, and must needs omit the names of many of those who are presently pursuing active investigations; however, it may give an overview of current work with selective focusing on what appear to be the highlights.

HONOURS

DR. H.R. ALDERTON and DR. D.H. FRAYN were elected Fellows of the American Psychiatric Association.

The Royal College of Psychiatrists, United Kingdom, elected PROFESSOR A.B. STOKES, Founding Fellow; DR. A. PARKIN, Fellow; DR. G.A. IVES, Founding Member; DR. J.M. BERG, Member; DR. A.L. JONES, Member.

DR. L.P. SOLURSH, President, Canadian Mental Health Association (Toronto Branch).

SCHOLARLY ADDRESSES

DR. H.R. ALDERTON, "Initial Relationship Between Child Adjustment, Family Adjustment and Visiting in Children Admitted for Residential Treatment," at the Annual Meeting, Canadian Psychiatric Association, Montreal; "Medication in Child Psychiatry," Dept. of Psychiatry, Hospital for Sick Children, Toronto.

DR. B. BATAGOL, "Developments in Psychiatry - The Toronto Scene," at the Royal Melbourne Hospital, Victoria, Australia.

DR. J.M. BERG, "Mental Retardation - Biological Facets," Stritch School of Medicine, Loyola University, Chicago; "Genetics of Mental Defect," Third Fotheringham Memorial Lecture, Clarke Institute of Psychiatry, University of Toronto; "Differentiation of Mental Deficiency," Northern New York Branch, American Psychiatric Association, Rome, New York.

DR. G.M. BROWN, "Psychological Regulation of Growth Hormone Secretion," Department of Psychiatry, McMaster University, Hamilton; "Hypothalamic and Median Eminence Catecholamines and Thyroid Function," First Annual Meeting of the Society for Neuroscience, Washington, D.C.; "Regulation of Growth Hormone Secretion," Merck Institute for Therapeutic Research, Rahway, N.J.; "The Hypothalamic, Growth Hormone and Adrenal Stress Responses," Addiction Research Foundation, Toronto.

DR. H. DUROST, "New Directions for Community Psychiatry," New Brunswick Mental Health Division.

DR. M.R. EASTWOOD, "Stress and Coronary Heart Disease: A Review," Research Seminar, Clarke Institute of Psychiatry.

DR. J.B. FOTHERINGHAM, "A Case Study of the Canadian Experience with the Mental Retardation Sections of the International Classification of Diseases, 8th Revision for the Year 1969," at the v World Congress of Psychiatry, Mexico City.

DR. D.R. FREEBURY, "The Long Arm of Research – Some Unexpected Outcomes with Implications for Nursing and Patient Care," presented to the Annual Meeting of the Registered Nurses Association of Ontario.

DR. S.J. FREEMAN, "Problems of Urban Living and Public Health," at the Fifteenth Annual Refresher Course, School of Hygiene, University of Toronto; "Community Mental Health," at the Muskoka Medical Society, Huntsville; "Family Therapy," Muskoka-Parry Sound Interprofessional Conference, Bracebridge.

DR. K.W. FREUND, "Measuring Feminine Gender Identity in Homosexual Males," at the 2nd World Congress on Transsexualism, Elsinore, Denmark; "Current Problems in Sex Deviation Research," at the Max Planck Institute of Psychiatry, Munich, Germany; "The Female Child as a Surrogate Object," v World Congress of Psychiatry, Mexico City; "Heterosexual Aversion in Homosexual Males," at the Annual Meeting of the Ontario Psychiatric Association, Toronto.

DR. H. GOLOMBEK, "Counselling on Adolescents," Peel County Board of Education, Toronto & District Association for Counselling and Attendance Services; "Attitudes and Needs of Contemporary Youth," School of Hygiene, University of Toronto (refresher course).

DR. S.E. GREBEN, "Presidential Address," to the Annual Meeting of the Ontario Psychiatric Hospital.

DR. J. HENDERSON, "Incest – A Synthesis of Data," at the Canadian Psychiatric Association Annual Meeting, Halifax (has been accepted for publication in the CPA Journal, but not yet allocated); "A Consultation Service to the Isolated North (Proposal for Community Transference)," v World Congress of Psychiatry, Mexico City; "Community Psychiatry – A Hard Look at Feasibility," at Canadian Psychiatric Association Annual Meeting, Montreal.

DR. O. HORNYKIEWICZ, "Parkinson's Disease: From Brain Homogenate to Treatment," 3rd meeting of the American Society for Neurochemistry, Seattle, Washington; "Brain Amines in Huntington's Chorea," Centennial Symposium on Huntington's Chorea, Columbus, Ohio; "Drugs Acting on the Central Nervous System," Postgraduate day on Clinical Pharmacology, Toronto Western Hospital.

PROFESSOR R.C.A. HUNTER, "Enfranchisement of Psychiatric Residents," delivered at the Department of Psychiatry, McGill University, Montreal.

DR. G.A. IVES, "Psychiatric Perspectives," to the Futurus Symposium of the "Century Two" Proceedings, London Psychiatric Hospital; "Review of Policies in the Mental Health Field," to Senior Staff Conference, Queen Street Mental Health Centre, Toronto; "The Psychiatric Hospital and the Clergy as a Team," to the Pastoral Counselling Association, Whitby Psychiatric Hospital.

DR. H.B. KEDWARD, "Social Medicine, Primary Care and Comprehensive Care" (Symposium on Community Medicine), Newfoundland; "A Study of the Social and Clinical Features of Chronic Psychiatric Patients in Great Britain and Canada," at the Clinical Research Society of Toronto.

DR. E. KINGSTONE, "Fluspirilene (R6218) – A Study of its Efficacy and Safety in Out-patients," to the Quebec Psychopharmacological Research Association.

DR. S.V. LEVINE, "Urban Communes – Fact or Fad, Promise or Pipe Dream," to American Orthopsychiatric Association Meeting, Detroit; "Social and Psychological Factors in Amphetamine Abuse," to International Symposium on Drug Abuse, Jerusalem, Israel; "Problems of Adolescence," to Workshop of Catholic Children's Aid Society; "The Drug Scene," to Postgraduate Refresher Course, Faculty of Medicine, University of Toronto.

DR. E.R. MARKSON (Panel presentation), "The Therapist's Contribution to the

Therapeutic Alliance," to Canadian Psychoanalytic Society (Ontario); "On the Genesis of the Sado-Masochistic Character," to Psychiatric Division, University Health Service, University of Toronto.

DR. C.H. MICKELSON, "The Developmental Concepts of Eric Ericson – a review of his writings," at the Scientific Meeting of the Department of Psychiatry, Sunnybrook Hospital, Toronto.

DR. E.H. PAKES, "The New Child and Family Unit at Hospital for Sick Children," Delivered to Medical Grand Rounds; "Psychiatric Implications of Facial Deformities Considered for Surgery," to Plastic Surgery Group of Toronto and to Research Seminar at Hospital for Sick Children; "Group Therapy for Parents of Leukemic Children," to Haematology Department and Department of Psychiatry, Hospital for Sick Children; "Psychiatric Aspects of Care for Leukemic Patients" (Panel), Alumni Association, Hospital for Sick Children.

DR. A. PARKIN, "Aspects of the Psychoanalytic Relationship" (Symposium), to Canadian Psychoanalytic Society (Ontario).

DR. NAOMI I. RAE-GRANT, "Longevity, Mobility and Spare Parts: Future Imperfect and Human Service Delivery," to American Orthopsychiatric Association, Detroit.

DR. QUENTIN RAE-GRANT, "Children's Services," Presented at Eighth Operations Training Course, University of North Carolina, Chapel Hill; "The Community's Responsibilities for Mental Health Decisions," Presented at 57th Annual Convention, International Association of Pupil Personnel Workers, Toronto; "How Many Beds and for Whom?" presented at staff development meeting, Thistletown Regional Centre; "Issues in Residential Care for Children," Hoffmann-LaRoche Lecture, Dalhousie University.

DR. QUENTIN RAE-GRANT and DR. G. SCHNEIDERMAN, "Tay-Sach's and Related Lipid Storage Diseases; A Study of Families," to be presented at 22nd Annual Meeting, Canadian Psychiatric Association, Montreal.

DR. V.M. RAKOFF, "Perceptual Research in the Family," Department of Psychiatry, University of Ottawa; "R.D. Laing and Existential Psychiatry," Department of Psychology, York University; "The Cult of the Spontaneous in Psychiatry," v World Congress of Psychiatry, Mexico City; "Problems of Research in Family Psychiatry," Department of Psychology, Hillside Hospital, New York; "Mutual Visual Perception in the Families of Disturbed Children," Department of Psychiatry, Queen's University, Kingston; "The Psychiatrist as Physician," Ontario Psychiatric Association Meeting, Toronto; "On Creativity," Department of Psychiatry, Hospital for Sick Children, Toronto.

DR. J.T. SALVENDY, "Tertiary Prevention in Chronic Psychiatric Patients – An Alternative to Chronic Hospital Care," to be presented at 4th International Congress of Social Psychiatry, Jerusalem, Israel.

DR. L. SLOMAN, "Examination and Modification of Parent Attitudes of Children with Learning Disability," at Canadian Psychiatric Association Meeting, Montreal.

DR. B.A. STEIN, "Psychiatric View of a Therapeutic Living Environment for Adolescents," at Canadian Psychiatric Association Meeting, Montreal.

DR. P.D. STEINHAUER, "The School – Help or Hindrance in the Struggle for Mental Health," address to Principal's Course, sponsored by Ontario Department of Education at York University, Trent University, and Queen's University; "The Rising Tide – Tensions in our Secondary Schools," address to Heads of Department Course sponsored by Ontario Department of Education, Western University, London; "Separation Trauma – Its Implications for the Child in Care," keynote address to Workshop on Separation Trauma held by staff of North Branch, Toronto Catholic Children's Aid Society; "Abruptio Familiae: The Premature Separation of the Family," Annual Meeting of Psychiatric Out-patient Centres of America, Detroit; "Behaviour Problems in Children," to College of Family Physicians (part of continuing education programme), Sunnybrook Hospital, Toronto.

DR. G.J. TAYLOR, "Psychotherapy of a Symbiotic Relationship," delivered to the

New Zealand Association of Psychotherapists Annual General Meeting, Wellington, New Zealand.

DR. R.E. TURNER, "Homosexuality," to Family Practice Day on theme "Problems of Sexuality Confronting the Family Physician," St. Michael's Hospital, Toronto; "Administration of Justice with Respect to Accused Persons Suspected to be of Unsound Mind," to Ontario Crown Attorneys Associations, North Bay.

DR. M. TYNDEL, "Psychiatric Study of 1000 Alcoholic Patients," at v World Congress of Psychiatry, Mexico City.

DR. J.A. WALTERS, "Clinical Methods for the Investigation of Bodily Pains," Clarke Institute of Psychiatry, Toronto.

STAFF CHANGES

Retirements

Dr. J.G. Dewan, Professor.

Resignations

Dr. R.E. Stokes, Associate Professor.

Promotions

To Assistant Professor: Dr. F. Allodi, Dr. P. Brawley, Dr. D.H. Frayn, Dr. W.A. Lyall, Dr. R.J. Mahabir, Dr. K.J. MacRitchie, Dr. B.C.L. Orchard, Dr. E.H. Pakes, Dr. L.B. Raschka, Dr. W.E. Robinson, Dr. B. Silverman, Dr. P.D. Steinhauer, Dr. J.R. Wilkes, Dr. R.V. Worling.

To Associate Professor: Dr. G.M. Brown, Dr. R.E. Stokes.

To Professor: Dr. V. Rakoff.

New Appointments

Dr. M.R. Eastwood, Assistant Professor; Dr. Ruth Easser, Associate Professor; Dr. S.R. Lesser, Associate Professor; Dr. M.P. Lau, Assistant Professor.

PUBLICATIONS

Alderton, H.R. "Enuresis" (*Canadian Medical Association Journal*, vol. 106, Jan. 1972, pp. 109-10)

Allodi, F., Freeman, S.J.J. *et al.* "Community Group Program: Evaluation of a Multi-Agency Therapeutic Social Club" (*Canadian Psychiatric Association Journal*, vol. 17, special supp. 1, Apr. 1972, pp. S45-50)

Atcheson, J.D. "Problems of Mental Health in the Canadian Arctic" (*Canada's Mental Health*, vol. 20, Jan.-Feb. 1972, pp. 10-17)

Baker, E.F.W. "Blood Pressure/Pulse Responses to Intravenous Methacholine in Psychiatric Illness" (*Canadian Psychiatric Association Journal*, vol. 16, Oct. 1971, pp. 441-3)

——— "Sodium Transfer to Cerebrospinal Fluid in Functional Psychiatric Illness" (*ibid.*, Apr. 1971, pp. 167-70)

Berg, J.M. "Aspects of Genetic Counselling in Relation to Chromosomal Aberrations"; in *Proceedings of 2nd Congress of International Association for Scientific Study of Mental Deficiency*, pp. 701-3. Warsaw: Polish Medical Publishers 1971

Berg, J.M. *et al.* "Behaviour and Intelligence in Males with xyy Sex Chromosomes"; in *ibid.*, pp. 135-41)

——— "Angelman's ("Happy Puppet") Syndrome" (*American Journal of Diseases of Children*, vol. 123, Jan. 1972, pp. 72-4)

Berger, D. "Neurophysiological Findings concerning Sleep and Psychoanalytic Theory" (*Canadian Psychiatric Association Journal*, vol. 16, Aug. 1971, pp. 295-304)

Brawley, P. *et al.* "Pharmacology of Hallucinogens" (*Pharmacological Reviews*, vol. 24, Mar. 1972, pp. 31-66)

——— "Hysteria: In Search of the Animus" (*Comprehensive Psychiatry*, vol. 12, May 1971, pp. 277-86)

Brown, G.M. *et al.* "Fine Structural Morphology of Adrenal Cortices of Normal and Stressed Squirrel Monkeys" (*Journal of Morphology*, vol. 134, Aug. 1971, pp. 447-65)

——— "Human and Monkey Thyroid Stimulating Hormone (TSH): Isoelectric Focusing (IEF) and Effects of Neuraminidase" (*Federation Proceedings*, vol. 31, Mar. 1972, p. 276) (abstract)

- "Hypothalamic Mediation of Growth Hormone and Adrenal Stress Responses in the Squirrel Monkey" (*Endocrinology*, vol. 89, Sept. 1971, pp. 694-703)
- "Isoelectric Focusing of Human Thyrotropin: Identification of Multiple Components with Dissociation of Biological and Immunological Activities" (*Abstracts, 47th Meeting, American Thyroid Association*, Birmingham, Alabama 1971, pp. 26-7)
- "The Mammalian Median Eminence: A Comparative and Experimental Model"; in *Brain-Endocrine Interaction. Median Eminence: Structure and Function*, ed. K.M. Knigge, D.E. Scott, and A. Weindl, pp. 35-49. Basel: S. Karger 1972
- "Psychological and Neural Regulation of Growth Hormone" (*Psychosomatic Medicine*, vol. 34, Jan.-Feb. 1972, pp. 45-51)
- "Septal Lesions and Resting Adrenal Function: A Possible Explanation of Conflicting Findings" (*Neuroendocrinology*, vol. 8, 1971, pp. 367-74)
- Brown, G.M. and Hornykiewicz, O. "Hypothalamic and Median Eminence Catecholamines and Thyroid Function"; in *Program, First Annual Meeting, Society for Neuroscience*, abstracts, p. 130. Washington, D.C. 1971
- Brown, G.M., Zajac, A.S. and Steiner, B.W. "Solid Phase Human Luteinizing Hormone (HLH) Radioimmunoassay (RIA): Findings in Intact and Castrated Transsexuals" (*Clinical Research*, vol. 19, Dec. 1971, p. 770) (abstract)
- Eastwood, M.R. "General Practice Research" (newsletter) (*Tasmania Faculty, The Australian College of General Practitioners*, no. 23, July 1971, pp. 7-9)
- Eastwood, M.R. *et al.* "Personality and Parasuicide" (*Medical Journal of Australia*, vol. 1, Jan. 1972, pp. 170-5)
- "Stress and Coronary Heart Disease" (*Journal of Psychosomatic Research*, vol. 15, Sept. 1971, pp. 289-92)
- Fotheringham, J.B. "School Counselling of Slow Learners at the Secondary School Level" (*School Guidance Worker*, vol. 25, July-Aug. 1971, pp. 39-42)
- Fotheringham, J.B. *et al.* *The Retarded Child and his Family*. Toronto: Ontario Institute for Studies in Education, Monograph Service no. 11, 1972
- Freeman, S.J.J. "Community Psychiatry in a Canadian Urban Setting" (*Canadian Psychiatric Association Journal*, special supp. vol. 17, Apr. 1972, pp. S3-13)
- *East York Project*, special supplement, *Canadian Psychiatric Association Journal*, vol. 17, Apr. 1972. Pp. 80
- "Introduction to Marriage"; in *Maturing in a Changing World*, by E.J. Shipton, N.S. Endler and F.D. Kemper, ch. 6, pp. 78-84. Toronto: Prentice-Hall 1971
- "The Community Aides: Corps of Indigenous Volunteer Case Aides" (*Canadian Psychiatric Association Journal*, special supp., vol. 17, Apr. 1972, pp. S57-62)
- "Family Life Education: Case Study of a Non-productive Community Intervention" (*ibid.*, pp. S63-9)
- "The Inpatient Service: Therapeutic Community versus Community Therapy" (*ibid.*, pp. S51-5)
- "Modes of Co-ordinating a Community Mental Health Network" (*ibid.*, pp. S15-24)
- Freund, K. "Note on the Use of the Phallometric Method of Measuring Mild Sexual Arousal in the Male" (*Behaviour Therapy*, vol. 2, Apr. 1971, pp. 223-8)
- Golombek, H. *et al.* "Psychiatric Consultation in a School Counseling Department" (*School Counselor*, vol. 19, Sept. 1971, pp. 38-42)
- Hornykiewicz, O. "Dopamine: its Physiology, Pharmacology and Pathological Neurochemistry"; in *Biogenic Amines and Physiological Membranes in Drug Therapy*, ed. J.H. Biel and L.G. Abood, Part II, vol. 5B, pp. 173-258. New York: Marcel Dekker 1971
- "Histochemistry, Biochemistry and Pharmacology of Brain Catecholamines in Extrapyramidal Syndromes in Man"; in *Monoamines Noyaux Gris Centraux et Syndrome de Parkinson*, ed. J. de Ajuriaguerra, pp. 143-57. Genève-Masson, Paris: Georg 1971
- "Neurochemistry of Parkinsonism"; in *Handbook of Neurochemistry*, ed. A. Lajtha, vol. 7, pp. 465-501. New York: Plenum 1972
- "Neurochemical Pathology and Pharmacology of Brain Dopamine and Acetylcholine: Rational Basis for the Current Drug Treatment of Parkinsonism"; in *Recent Advances in Parkinson's Disease*, ed. F.H. McDowell and C.H. Markham, pp. 34-65. Philadelphia: F.A. Davis 1971
- "Pharmacology and Pathophysiology of Dopaminergic Neurons"; in *Advances in Cytopharmacology*, ed. F. Clementi and B. Ceccarelli, vol. 1, pp. 369-77. New York: Raven Press 1971
- Hornykiewicz, O. *et al.* "Experimental Midbrain Lesions: Neurochemical Comparison between the Animal Model and Parkinson's Disease" (*Brain Research*, vol. 35, 1971, pp. 613-18)
- "L-DOPA Treatment in Parkinson's Disease. Effects on Dopamine and Related Substances in Discrete Brain Regions" (*Experientia*, vol. 7, 1972, pp. 1048-9)
- "Model for the Quantitative Study of Central Dopaminergic and Serotonergic Activity" (*European Journal of Pharmacology*, vol. 18, 1972, pp. 128-36)
- Kedward, H.B. "Limits of Psychiatric Epidemiology" (*Canadian Psychiatric Association Journal*, vol. 17, Feb. 1972, pp. 35-40)
- Kingstone, E. *et al.* "Institutional Transference and Disengagement - Study of an Out-Patient Clinic" (*Canadian Psychiatric Association Journal*, vol. 16, June 1971, pp. 227-32)

- Levine, S.V. *et al.* "The Speed User: Social and Psychological Factors in Amphetamine Abuse" (*Canadian Psychiatric Association Journal*, vol. 17, June 1972, pp. 229-41)
- "Brief Psychotherapy with Children: Process of Therapy" (*American Journal of Psychiatry*, vol. 128, Aug. 1971, pp. 141-6)
- "Brief Psychotherapy with Children: Preliminary Report" (*Yearbook of Psychiatry and Applied Mental Health*, 1972, pp. 107-8)
- Lovett Doust, J.W. *et al.* "Linc-8 Sampling and Analysis of Rheoencephalograph Waveform" (*Proceedings Digital Equipment Computer Users Society (DECUS)*, Maynard, Mass., Fall Symposium, Nov. 1971, pp. 11-13)
- Lyall, W.A.L. *et al.* "Community Psychiatry and the Public Health Nurse: Evaluation of a Training Program" (*Special Supplement, Canadian Psychiatric Association Journal*, vol. 17, Apr. 1972, pp. S39-44)
- "Evaluation of the East York Community Psychiatric Project" (*ibid.*, pp. S71-6)
- Mamelak, M. *et al.* "Evidence for Involvement of Microtubules in the Action of Vasopressin on Osmotic Water Movement" (*Federation Proceedings*, vol. 31, 1972, p. 824) (abstract)
- Moldofsky, H. "Occupational Cramp" (*Journal of Psychosomatic Research*, vol. 15, Oct. 1971, pp. 439-44)
- "Psychophysiological Study of Multiple Tics" (*Archives of General Psychiatry*, vol. 25, July 1971, pp. 79-87)
- Moldofsky, M. *et al.* "Personality, Disease Parameters and Medication in Rheumatoid Arthritis" (*Journal of Chronic Diseases*, vol. 24, June, 1971, pp. 363-72)
- Moscarello, R. "Thoughts on the Status of Women" (*Canada's Mental Health*, vol. 20, Jan.-Feb. 1972, pp. 30-5)
- Paitich, D. "Psychology as a Mental Health Profession and Discipline" (*Ontario Psychologist*, vol. 3, 1971, pp. 79-84)
- Rapp, M.S. "Psychiatrist's View of the Human Factors Involved in Safety Planning" (*Journal of the American Society of Safety Engineers*, vol. 17, Mar. 1972, pp. 26-31)
- Rae-Grant, Q. "Community's Responsibilities for Mental Health Decisions" (*Journal of the International Association of Pupil Personnel Workers*, vol. 26, Jan. 1972, pp. 13-18)
- "Fight, Fright or Flight? Discussion of the Manifestations and Management of Anxiety in Children" (*Journal of the Ontario Speech and Hearing Association*, 1971, pp. 2-14)
- "Understanding the Teenager" (*New Minority at HSC*, May-June 1971)
- Rae-Grant, Q. *et al.* "Principles of Parsimony in Mental Health Center Operations" (*Canada's Mental Health*, vol. 20, Jan.-Feb. 1972, pp. 18-24)
- Rakoff, V. *Phantasy and Impulse*. CBC Publication 1971
- Rakoff, V. *et al.* "Concentration Camp Survival - Pilot Study of Effects on the Second Generation" (*Canadian Psychiatric Association Journal*, vol. 16, Oct. 1971, pp. 393-7)
- "Decision-making as to the Choice of Family Therapy in an Adolescent In-Patient Setting" (*Family Process*, vol. 10, 1971, pp. 97-110)
- "Process and Outcome in Conjoint Family Therapy" (*ibid.*, pp. 451-73)
- "Reliability of Coding Affective Communication in Family Therapy Sessions: Problems of Measurement and Interpretation" (*Journal of Consulting and Clinical Psychology*, vol. 37, June 1971, pp. 397-402)
- Salvendy, J.T. "Psychiatry in Vienna Today" (*Canadian Psychiatric Association Journal*, vol. 16, Apr. 1971, pp. 171-80)
- Salvendy, J.T. and Jameson, J. "Implications of Recent Dream Research" (*Canadian Psychiatric Association Journal*, vol. 16, Aug. 1971, pp. 305-15)
- Sloman, L. "Consultation to a Special School" (*Hospital and Community Psychiatry*, vol. 22, Dec. 1971, pp. 375-8)
- Solursh, L.-P. "Attitudes of Medical Students towards Cannabis" (*Journal of American Medical Association*, vol. 217, Sept. 1971, pp. 1371-2)
- Stokes, A.B. "Random Thoughts on the Socialization of Psychiatry" (Presidential address, *Canadian Psychiatric Association Journal*, vol. 16, Oct. 1971, pp. 381-6)
- Tyndel, M. "Beitrag zur Kasuistik und Psychopathologie der wahrend der Nationalsozialistischen Verfolgung Geborenen Kinder"; in *Spatschaden nach Extrembelastungen*, ed. H.J. Herberg, pp. 266-9. Herford: Nicolaische Verlagsbuchhandlung 1971
- Wilkes, J.R. "Learning Disability - the Latest Bandwagon" (*Canadian Medical Association Journal*, vol. 106, Mar. 18, 1972, pp. 645-7)

RADIOLOGY

Under the direction of Professor R.B. Holmes

The departmental activities generally continued in the pattern established in recent years with a few notable changes. The Division of Therapeutic Radiology has just

completed its first year of undergraduate teaching of Medical Oncology in Period III with three to six students in attendance at any one time. This has required major organization and efforts by faculty members concerned, but the early impression gained is that the programme is developing successfully. The decision by the Faculty Committee to remove the Diagnostic Radiology block of time completely from the Period III curriculum is a source of considerable concern. Alternative suggestions have been made which amount simply to a reversion to the old seminar-type teaching methods which were in force before the new curriculum existed, and which were never considered as particularly successful. However, the Department has agreed to revert to the old system on a trial basis for the 1972-3 year, after which time a decision about continuing this type of teaching will be reached.

There is also concern in respect to the Period II programmes about the extreme variation in the extent of participation by Radiology members of the faculty; for example, in some systems, where patient care and demonstration of the disease process is dependent to a very high degree on the participation of Radiology, there is a significant participation by Radiology faculty. In other systems, where Radiology plays an equally important role, there is practically no involvement by radiologists. These discrepancies leave the Department confused as to its real role in this part of the undergraduate curriculum.

On the postgraduate scene the programmes which were to a considerable extent hospital-operated are evolving into a single integrated and university-operated programme, co-ordinated by one individual who is specifically charged with this task. The first year's experience with the new format has been successful and we believe will result in many improvements.

The Research Laboratories continue to thrive and progress in a gratifying manner in respect to the growth and extent of the programmes and the number of individuals participating. The laboratories are rapidly developing an excellent international reputation.

The continued lack of budget support from the Faculty of Medicine continues in the Chairman's opinion to be a serious factor in holding back the academic orientation and development of the Department with a consequent overbalance of emphasis on the service side.

During the year we were honoured by visits from the following: Dr. Janet Dacie, London, England; Dr. Maurice Dufresne, University of Montreal; Dr. Robert Fraser, McGill University; Dr. Walter Fuchs, University of Berne, Switzerland; Dr. G. Gill, McMaster University; Dr. D. Gough, Belfast, N. Ireland; Dr. John Gwinn, University of California, Los Angeles; Dr. H.W. Ha, Peking, China; Dr. Jack Haye, Institute of Immunology, Basel, Switzerland; Dr. C.J. Hodson, Memorial University; Dr. Thure Holm, University of Lund, Sweden; Dr. R. Hoy, University of Pittsburgh; Dr. Peter Hicken, Queen Elizabeth Medical Centre, Birmingham, England; Dr. Everette James, Johns Hopkins Medical School, Baltimore; Dr. K. Jonsson, University of Lund, Sweden; Dr. S.B. Lagundaye, University of Ibadan, Nigeria; Dr. H. Lake, Melbourne, Australia; Dr. L. Masjuan, Madrid, Spain; Dr. Lynne Reid, Brampton Institute for Diseases of the Chest, London, England; Dr. D.G. Wollin, Queen's University, Kingston.

RESEARCH

Dr. D.J. Alton is carrying out research with Dr. P. McDonald into Ureterocele in Childhood, and also the duplication of the urinary tract.

Dr. B. Bird is evaluating a one-second M.E.V. chest film for air trapping in collaboration with Dr. Douglas in the Respiratory Laboratory.

Dr. Campbell, Dr. K. Tam, and Mr. R. Reed are carrying out research into the micro-radiographic correlation of histological and radiological bone loss in various diseases.

Dr. G. Cooke is investigating the postoperative defects produced by surgical procedures on the stomach.

Dr. W.A. Cumming is carrying out research with Dr. S.W. Kooh on transient osteoporosis in children and renal osteodystrophy in children, and renal osteodystrophy as evidence in dental radiographs with Dr. S. Fireman.

Dr. J.W. Davidson is continuing a detailed analysis of the radiographic morphology of lymph nodes; the radiographic changes in lymph nodes during the primary immune response to an injected antigen; cholecystography as a means of studying epidemiological aspects of the gall bladder.

Dr. D.L. Gilday is carrying out research into the following: Subdural Hematoma: brain scanning correlated with angiography and the assessment of the role of nuclear medicine; Subdural Hematoma: a reclassification, with Drs. G. Wortzman and others; Gastric Emptying Time Studies, with D.E. Wood and others; Craniotomy defects in brain scans: A temporal relationship, with D.E. Wood and others; comparison of right upper lobectomies in dogs with and without sleeve resections, with Drs. D. Wood, G. Pearson, and others; Choice of Optimal Technetium – 99m brain scan dose, with Drs. D.E. Wood and M. King; 99m tc-cysteine as a brain scanning agent, with Drs. H. Kellam, G. Tator, and D.E. Wood; What is the normal RAIU in Pediatrics? Dr. D.E. Wood.

Dr. J. Halls, with Dr. Don Currie, is undertaking a programme to produce gallstones in guinea pigs and their dissolution using bile acids and/or lecithin. Dr. Halls, with Dr. E. Prokipchuk, is continuing his double-blind study on the effects of imuran on Crohn's disease.

Dr. D.C.F. Harwood-Nash and Dr. C.R. Fitz are carrying out research into the following: Cerebral abscesses in 135 infants and children; Posterior prolapse of vertebral bodies in children; Clinical and radiological aspects of porencephaly and polyporencephaly; Lateral Facial Dysplasias, with Dr. B. Ross, Department of Dentistry; Cerebral aneurysms in infants and children; the development of a paediatric cradle for the Mimer III; the radiological assessment of cleft palate repair, with Dr. Hugh Thomson; neuroradiology of tuberous sclerosis in children; the neuroradiology of brain stem tumours in children; normal and abnormal small cerebral arterioles in children utilizing magnification and induced hypocarbia, with Dr. R. Creighton, Department of Anaesthesia; the effect of hypaque on the cerebral arterial pO_2 , with Dr. R. Creighton, Department of Anaesthesia.

Dr. W.G. Holland is carrying out research in injuries of the cervical spine in children.

Dr. A. Humphry is carrying out research into the following: inhaled foreign bodies – roentgenographic identification and localization; aseptic necrosis of epiphyses in children following steroid therapy; association of thickening of cranial vault with cyanotic heart disease.

Dr. R.W. McCallum is carrying out research into the following: sympathetic hyperreflexia presenting as hypertension in paraplegics. Dr. McCallum is studying chronic alcoholism.

Dr. H.E. Meema is continuing studies on longitudinal radiographic densitometric bone mineral measurements and microradioscopic studies of bone structure in osteoporosis and other metabolic bone diseases.

Dr. E.N.C. Milne is carrying out research into the following: a quantitative study of tumour microcirculation during and after irradiation; pulmonary microcirculation; magnification technics using X-ray-sensitive vidicon.

Dr. C.A.F. Moes is carrying out research into the following: radiological and clinical evaluation of innominate artery compression of the trachea; angiocardio-graphic evaluation of aortic septal defects; tricuspid bump – a diagnostic sign in the angiocardio-graphic diagnosis of tricuspid atresia; malformed mitral valve with stenosis simulating left ventricular tumour; evaluation of aortic arch vascular anomalies; evaluation of the plain film X-rays in patients following the Mustard procedure for complete transposition of the great arteries; double outlet right ventricle: new type with d-loop and 1-malposition of the great arteries.

Dr. M. Moores is carrying out a mathematical study of the effects of focal spot intensity distribution on image formation, and is designing and building an X-ray tube

with demountable cathode and anode to permit actual X-ray experimentation with various configurations of focal spots – anode/cathode distances and electron focusing arrangements.

Dr. B.J. Reilly together with Dr. J.A. Lowden is carrying out research into the following: hereditary abnormalities in mucopolysaccharide excretion associated with skeletal defects (The Research Institute, H.S.C.). Dr. Reilly is also studying the gravity-dependent distribution of atelectasis and pulmonary edema in neonates with respiratory distress; the pulmonary changes in neonates who have had assisted ventilation and oxygen therapy; non-involution of the thymus in infants with RDS; patterns of pulmonary abnormality in neonatal aspiration pneumonia; radiological assessment of serial pulmonary changes in mist-tent treated patients with cystic fibrosis; lung hypoplasia and membranous diaphragm in the congenital rubella syndrome.

Dr. Samu, in collaboration with Dr. Yao and Dr. Forbath, is reviewing twenty-six cases of fascia lata aortic valve replacement.

Dr. Sieniewicz is studying the optimum screens and film for high K.V. air-gap chest radiography.

HONOURS

DR. L.R. HARNICK was appointed as President of the Ontario Medical Association.

DR. D.C.F. HARWOOD-NASH was visiting Professor of Neurosurgery and Neuro-radiology, University of Cincinnati, April 1972. He was also named the Inaugural Speaker at the Utah Neurology and Neurosurgical Society, 1971.

DR. R.B. HOLMES was named Vice-President of the Canadian Association of Radiologists.

DR. H.E. MEEMA was presented with the second prize by the 35th Annual Meeting of the Canadian Association of Radiologists for the scientific exhibit "Microradioscopy and Microradiography of Bone," January 1972, Toronto, Ontario.

DR. B.J. REILLY was named the President of the Toronto Radiological Society.

SCHOLARLY ADDRESSES

F.A. BEALE, "Accessory Sinus Cancer," Canadian Society of Otolaryngology, Montreal; "Radiation Therapy in the Management of Malignant Tumours of the Para-nasal air Sinuses," Radiological Society of North America, Chicago.

P.E. BOBECHKO, "Epidemiology of Cholelithiasis and Crohn's Disease," Canadian Association of Radiologists, January 1972, with J.D. Billings and J.W. Davidson.

R.S. BUSH, "Time-dose Relationships," Canadian Association of Physicists, Ottawa.

R.F. COLAPINTO, "The Routine Lateral Aortogram and the Celiac Compression Syndrome," Radiological Society of North America.

W.A. CUMMING, "Fatigue Aspiration," Radiological Society of North America, Chicago.

J.R. CUNNINGHAM, "A Mathematical Model for Radiobiology," Canadian Association of Physicists, Ottawa.

J.W. DAVIDSON, "Lymphography in the Experimental Animal," Canadian Association of Laboratory Animal Sciences; "Lymphography and Prognosis in Carcinoma of the Cervix," Canadian Association of Radiologists, Toronto and Royal College of Physicians and Surgeons of Canada; "Radiographic Features of an Immune Response," Radiological Society of North America, and Canadian Association of Radiologists, and Association of University Radiologists; "Radiographic Features of Intestinal Lymphangiectasia," Canadian Association of Radiologists.

P.J. FITZPATRICK, "Philosophy of Management of Metastatic Nodal Disease in the Neck," American Society of Therapeutic Radiologists, Phoenix; "Tumours of the Eyelids and Their Management by Radiotherapy," Radiological Society of North America, Chicago.

D.L. GILDAY, "Subdural Hematomas; Brain Scanning Correlated with Angiography and Assessment of the Role of Nuclear Medicine," Society of Nuclear Medicine; "Lung Scan Patterns in Pulmonary Embolism Versus Those in Congestive Heart Failure and Emphysema," American Roentgen Ray Society; "Reclassification of the Angiographic Appearances of Subdural Hematomas," Canadian Association of Radiologists.

D.C.F. HARWOOD-NASH, "A New Paediatric Chair for Pneumoencephalography in Children," and "Porencephaly and Polyporencephaly in Children," and "Rotatory Fixation of the Atlantoaxial Joint in Children," Association of Neuroradiologists, Mexico City, Mexico; "The Ambling Artery of Adamkiewicz," Society of Pediatric Radiology, Boston; "Intracranial Abscesses in 135 Children and the Use of Barium as a Cavity Marker," and "Intracranial and Intraspinal Tumours in Children, Plain Film Abnormalities," The Radiological Society of North America, Chicago; "Paediatric Neuroradiology and Special Procedures," and "Acquired Cerebral Arterial Disease in Children," and "Neuroradiology About the Sella," and "Intracranial Tumours in Children," University of Utah, Salt Lake City, Utah; "Tomography About the Sella," Utah Neurological and Neurosurgical Society, Salt Lake City, Utah; "Skull Trauma in Infants and Children," Canadian Association of Radiologists, Toronto, and "Tomography About the Sella," Canadian Association of Radiologists, Toronto; "Intracranial Venous Thromboses in Children," and "Cerebral Arterial Disease in Children," and "Neuroradiology of Intracranial Abscesses," and "Neuroradiology of Intracranial Tumours in Children," and "Polyporencephaly," and "Special Techniques in Paediatric Neuroradiology," The University of Cincinnati; "Orbital Tumours in Children," and "The Radiology of Extradural Haematomas in Children," and "Plain Film Findings in Skull Trauma in Children," Fourth International Paediatric Neuroradiological Symposium, Chicago; "Angiography in Head Injuries in Children," Canadian Neurosurgical Society, Banff.

B.B. HOBBS, "Angiography of Avascular Benign Liver Masses," Canadian Association of Radiologists; "Microcirculation of Mammalian Lymph Nodes," Toronto Society for Clinical Research.

R.D.T. JENKIN, "Malignant Bone Tumours of Childhood. The Management of Phabdomyosarcoma," Fifth Annual Radiotherapy Symposium, Clinical Pediatric Oncology, Miami; "Malignant Disorders in Childhood," Interamerican Congress of Radiology, San Juan, Puerto Rico; "Medulloblastoma," International Society of Pediatric Oncology, Mainz, Germany, October 1971; "Radiotherapy of Primary Malignant Bone Tumours in Childhood," 13th International Congress of Pediatrics, Vienna, Austria.

D.V. McFARLANE, "Mammography and New Techniques," Canadian Association of Radiological Technicians, Hamilton.

M.J. McLoughlin, "Angiography of Vascular Benign Liver Masses," Canadian Association of Radiologists.

H.E. MEEMA, "Microradioscopic Bone Structure of the Hand in Thyrotoxicosis, Renal Osteodystrophy and Acromegaly," to International Symposium: Clinical Aspects of Metabolic Bone Disease, Henry Ford Hospital, Detroit; "Microradioscopy and Microradiography of Bone," American Roentgen Ray Society, Boston, Mass. and Canadian Association of Radiologists, Toronto, Ontario; "The Combined Use of Morphometric and Microradioscopic Methods in the Diagnosis of Metabolic Bone Diseases," Deutscher Roentgenkongress, Stuttgart, Germany.

E.N.C. MILNE, "The Early Diagnosis of Chronic Obstructive Lung Disease," "Combined Chronic Obstructive Pulmonary Disease and Cardiac Failure," University of Berne, Switzerland; "Focal Spot Intensity Distribution, MTF's and X-ray Image Formation," Karlinska, Sjukhuset, Stockholm; "The Radiology of Chronic Obstructive Pulmonary Disease," "X-ray Image Formation," "Magnification Radiology," Westminster Hospital, London, England; "Physical Factors Affecting X-ray Formation in Conventional and Magnification Radiology. MTF's for the Radiologist," Westminster Hospital, London, England; "The Radiology of Chronic Obstructive Pulmonary Disease," "The X-ray Image Formation," "Magnification Radiology," Uni-

versity of Turku, Abo, Finland; "Intensity Distribution, Spurious Resolution and Phase Shifts in Radiology," Annual Meeting, Optical Society of America, Ottawa, Canada; "Lasers and Holography in Radiology," Ontario Hospitals Association; "The Radiologic Assessment and Importance of Pulmonary Extravascular Water," Ontario Thoracic Society, Toronto; "Minute Focal Spots in Radiology," "Heart Failure in Chronic Lung Disease," Ohio State University, Columbus, Ohio; "Chest X-ray Interpretation Based on Pulmonary Blood Flow Distribution," Central Ohio Radiological Society; "Holography in Radiology," "Selection of Imaging Techniques in the Research Laboratory" (McIlmoyle and Milne), "Effects of Focal Spot Intensity Distribution on Image Formation," Research Section, Canadian Association of Radiologists; "Generators for Angiography," "The Fundamentals and Future Developments of TV Imaging Systems, Intensifying Tubes and Magnetic Discs," Symposium on Angiography, Advances in Equipment and Technical Aspects, Las Vegas, Nevada (in conjunction with University of Pittsburgh School of Medicine); "Modulation Transfer Functions – Significance in Terms of Radiologic Image Formation," Columbia Presbyterian University, New York; "The Vascular Supply of Pulmonary Metastases – Evidence for Pulmonary Artery Angiogenesis," Creative Concepts in Academic Radiology, Vail Conference, Vail, Colorado; "The Physiological Approach to Interpretation of Chest X-rays," Aspen Conference on "Current Concepts in Chest, GI, GU, and Neuroradiology," Aspen, Colorado; "Radiologic Quantitation of Lung Water," "Holography-Radiologic Applications," "Chest X-ray Interpretation Based on Pulmonary Blood Flow Distribution," "The Early Diagnoses of Chronic Lung Disease," "False Images, Phase Shifts and Spurious Resolution in Radiology," Johns Hopkins Medical School, Baltimore; "Pharmaco-angiography and Re-activity of Small Pulmonary Vessels," NIH Sponsored Symposium on Small Vessel Angiography, Association of University Radiologists, Glen Cove, New York; "X-ray Vidicon Magnification – A Developing Clinical Tool," Fleischner Society, Montreal; "The Influence of Chronic Obstructive Pulmonary Disease on the Radiological Picture of Left Heart Failure," Post Graduate Course on Radiology of the Chest, Montreal.

C.A.F. MOES, "Supravalvular Pulmonary Stenosis in Association with an Odd Facial Appearance," Canadian Association of Radiology.

B.M. MOORES, "A Theoretical Study of the Effect of Size and Intensity Distribution of the Focal Spot on its Resolving Capabilities," Canadian Association of Radiologists.

R.M. PARRISH, "Pre-examination Color Cleansing – An Intradepartmental Function," Canadian Association of Radiologists; "Endoscopic and Radiological Correlation of Gastric Lesions," Canadian Association of Radiologists.

M.V. PETERS, "Radiation Therapy Related to the Patterns of Presentation in Hodgkin's Disease," North Eastern New York Radiologic Society, St. Peter's Hospital, Albany; "The cure of Hodgkin's Disease," Long Island Jewish Medical Center, Jamaica, New York.

B.J. REILLY, "The Chest X-ray in Babies 1000G & Less," Canadian Association of Radiologists; "Patterns of Pulmonary Involvement in the Idiopathic Respiratory Distress Syndrome," Soc. for Ped. Rad., Boston; "Radiographic Patterns of Atelectasis & Interstitial Edema in Newborns with Respiratory Distress," Ontario Thoracic Society; "Radiologic Aspects of Dwarfing in Childhood," Alumni Association of The Hospital for Sick Children.

D.F. RIDEOUT, "How Can Cancer be Beaten, The Role of Diagnostic Radiology," The Canadian Cancer Society, Port Hope, Ontario; "Mammography in Diagnosis of Carcinoma of the Breast," 9th Annual Cancer Symposium of the University of Western Ont.; "The Place of Tomography in the Investigation of Tumours of the Larynx," Canadian Association of Radiologists, Toronto; "Mammography and Thermography," Canadian Association of Radiologists, Toronto; "Diagnostic Radiology in Early Detection and Mass Screening," Second Canadian Science Writers Symposium; "Breast Carcinoma – High Risk Patients Studied by Thermography," Annual Meeting of American Thermographic Society, San Francisco.

P. SAMU, "16mm Cine Quality – Optimizing Film and Development Selection," Can. Assoc. of Rad., Toronto.

D.E. SANDERS, "Intrathoracic Changes Associated with Immunosuppressive Therapy," Ontario Thoracic Society.

STAFF CHANGES

Deaths

We note with regret the sudden death of Dr. M.R. Hall, Emeritus Professor of Radiology on 13 June 1970.

New Appointments

We note the new appointment of Dr. G.S. Bird as Radiologist-in-Chief, Wellesley Hospital, on 1 July 1971, succeeding Dr. K.F. MacEwen.

PUBLICATIONS

- Colapinto, R.F., McLoughlin, M.J. *et al.* "The Routine Lateral Aortogram and the Celiac Compression Syndrome" (*Radiology*, vol. 103, June 1972, pp. 557–64)
- Davidson, J.W. "Pulmonary Complications of Lymphography" (letters to the editor, *New England Journal of Medicine*, vol. 284, July 1971, pp. 237–8)
- "Radiology as a Career" (letters to the editor, *British Medical Journal*, no. 5797, Feb. 12, 1972, p. 446)
- Davidson, J.W., Reilly, B.J. *et al.* "Lymphangiectasis of the Skeleton: A Case Report" (*Radiology*, vol. 103, May 1972, p. 385)
- Gilday, D.L. *et al.* "The Role of Brain Scanning in the Differential Diagnosis of Epilepsy" (*Canadian Medical Association Journal*, vol. 106, May 1972, p. 1091)
- Harwood-Nash, D.C.F. "The Cerebrogram and Spinal Cordogram" (*American Journal of Roentgenology*, vol. 114, Apr. 1972, pp. 773–80)
- "Optic Gliomas and Pediatric Neuroradiology" (*Radiology Clinics of North America*, vol. 10, Apr. 1972, pp. 83–100)
- Harwood-Nash, D.C.F. *et al.* "Axial Tomography of Optic Canals in Diagnosis of Children's Eye and Optic Nerve Defects" (*American Journal of Ophthalmology*, vol. 72, Dec. 1971, pp. 1122–9)
- "The Significance of Skull Fractures in Children" (*Radiology*, vol. 101, Oct. 1971, pp. 151–5)
- "The Use of Axial Tomography of the Optic Canals in Children" (*Transactions of the American Ophthalmological Society*, vol. 69, 1971, pp. 279–92)
- Hobbs, B.B. *et al.* "Effects of Acute Lobar Atelectasis on Pulmonary Hemodynamics" (*Investigative Radiology*, vol. 7, Jan.–Feb. 1972, pp. 1–10)
- Humphry, A. and Wallace, W.B. "Inhaled Foreign Bodies – Roentgenographic Identification and Localization" (35th Annual Meeting of Canadian Association of Radiologists, Toronto, Jan. 17–21, 1972) (exhibit)
- Jenkin, R.D.T. "Radiotherapy"; in *Oncology. 1970, Proceedings of the 10th International Cancer Congress*, vol. 4, *Diagnosis and Management of Cancer*, p. 424. Chicago: Year Book Medical Publishers 1971
- Milne, E.N.C. and Holmes, R.B. "Radiologic Research" (editorial, *Journal of the Canadian Association of Radiologists*, vol. 23, Mar. 1972, p. 2)
- Milne, E.N.C. and Davidson, J.W. "The University of Toronto Radiological Research Laboratories. A Unique Training Environment for Radiologists and Technicians" (special report, *Canadian Medical Association Journal*, vol. 106, Mar. 18, 1972, p. 706)
- Milne, E.N.C., McIlmoyle, G., and Moores, B.M. "Effective Focal Spot Size" (*Investigative Radiology*, vol. 7, Mar.–Apr. 1972, pp. 124–8)
- McLoughlin, M.J. "Angiography in Cavernous Haemangioma of the Liver" (*American Journal of Radiology*, vol. 63, 1971, pp. 50–5)
- McLoughlin, M.J. *et al.* "Cineangiographic Assessment of Mitral Regurgitation. A Comparison of Cineangiography with other Methods, particularly Constant Infusion of 133 Xenon" (*Investigative Radiology*, vol. 6, 1971, pp. 416, 425)
- McRae, D.L. "Craniolacunias" and "Cranio-cerebral Junction"; in *Radiology of the Skull and Brain*, by T.H. Newton and D.G. Potts. St. Louis: C.V. Mosby 1971
- Review, *Journal of the Canadian Association of Radiologists*, vol. 22, Sept. 1971, p. 230
- Meema, H.E. "Estimation of Bone and Skeletal Weight by Direct Photon Absorptiometry" (letter to the editor, *Investigative Radiology*, vol. 6, Nov.–Dec. 1971, p. 432)
- "Microradioscopy and Microradiography of Bone" (scientific exhibit, *American Journal of Roentgenology*, vol. 113, Dec. 1971, p. 787)

- Meema, H.E. *et al.* "Comparison of Microradioscopic and Morphometric Findings in the Proximal Radius in Thyrotoxicosis and in Renal Osteodystrophy" (*Investigative Radiology*, vol. 7, Mar.-Apr. 1972, pp. 88-96)
- "Improved Radiological Diagnosis of Azotemic Osteodystrophy" (*Radiology*, vol. 102, Jan. 1972, pp. 1-10)
- "Simple Radiologic Demonstration of Cortical Bone Loss in Thyrotoxicosis"; in *Year Book of Radiology*, pp. 113-14. Chicago: Year Book Medical Publishers 1972
- Moes, C.A.F. *et al.* "Congenital Transposition of the Right Atrial Appendage" (*American Journal of Diseases of Children*, vol. 121, 1971, p. 508)
- Patt, N.L. *et al.* "Foreign Particle Embolism in Drug Addicts: Respiratory Pathophysiology" (*Annals of Internal Medicine*, vol. 75, Dec. 1971, pp. 865-72)
- Peters, M.V. "Lymphoma: Historical Perspectives in Hodgkin's Disease"; in *Oncology, 1970, 10th International Cancer Congress*, vol. 4, *Diagnosis and Management of Cancer*, p. 483. Chicago: Year Book Medical Publishers 1971
- "The Need for a New Clinical Classification in Hodgkin's Disease" (*Cancer Research*, vol. 31, 1971, p. 1713)
- Rideout, D.F. and Peters, M.V. *et al.* "Laparotomy for Hodgkin's Disease: Some Surgical Observations" (*Surgery*, vol. 71, May 1972, pp. 694-703)
- Rider, W.D. "Radiosensitivity - what is it?" (*Laryngoscope*, vol. 81, 1971, p. 1045)
- Shulman, H. *et al.* "Arteriographic Findings in the Various Stages of Renal Tuberculosis" (*Radiology*, vol. 100, Sept. 1971, pp. 597-602)
- "Invasive Carcinoids" (*Year Book of Radiology*, 1972, pp. 193-4)
- Simpson, W.J.K. "The Treatment of Central Nervous System by Radiation" (*Modern Medicine of Australia*, vol. 14, 1971, p. 3)
- Wortzman, G. *et al.* "Meningioma of the Temporal Bone" (*Canadian Journal of Otolaryngology*, vol. 1, 1972, pp. 16-20)

REHABILITATION MEDICINE

Under the direction of Professor A.T. Jousse

There have been several significant changes during the year. (1) The degree courses in Occupational Therapy and in Physical Therapy have been launched as of September 1971 and the first professional year (second year of university attendance) has now been completed. (2) The Division has been recategorized as a Department and the Director will be a full professor and Chairman hereafter. (3) There has been a determined and successful effort by Dr. Franks to obtain support for a greater number of academic staff in the section of Speech Pathology and several additional staff have been added.

RESEARCH

Dr. Charles Godfrey has applied his time and energies to the following research and development activities: (1) an investigation into the effect of foot mass on prosthetic gait; (2) an investigation into the stability and energy factors of various knee joints with the prosthetic limb; (3) development of an improved intra-oral electronic voice production unit; (4) development of an improved all purpose last for the arthritic foot.

Drs. Jousse, Geisler, Wynne Jones, and Barnett (U.W.O.) are carrying out studies on: (1) the pathological and clinical findings related to covitation within the spinal cord which appear as a late sequel to traumatic paraplegia; (2) Drs. Barnett, Jousse, Sawa, and Wortzman have written a paper (unpublished) on syringomyelia resulting from arachnoiditis. A third project is that being carried out by Dr. E.H. Botterell, Dr. W.O. Geisler, Dr. Megan Wynne Jones, Dr. Robert Morgan, and Dr. A.T. Jousse. It consists of a retrospective study of traumatic spinal cord injuries in Ontario during the years 1969 and 1970 and is entitled "Study of Circumstances and Systems of Management of Acute Spinal Cord Injuries in Ontario."

SCHOLARLY ADDRESSES

C.M. GODFREY, "The Origins of Medical Education for Women in Ontario," to the section, History of Medicine, Academy of Medicine, Toronto, 8 March 1972; "Cholera Epidemics," to the Canadian Society for the Study of the History and Philosophy of Science, 10 November 1971 in Toronto; "The Feet—Examination, Diagnosis, and Treatment," and "Whiplash," to the College of Family Physicians of Canada (Ontario Chapter), 18 October 1971.

J.S. CRAWFORD, "Medical Approach to the Care of the Hemiplegic," to the Postgraduate Refresher Course for Physiotherapists, November 1971 at the Toronto Western Hospital.

STAFF CHANGES

The Director of the Division has resigned as such, but will continue to perform professorial duties.

Mrs. J. Lesley and Mrs. E. Chaffey have resigned.

Miss P. Faris is on leave of absence (Sabbatical).

Dr. J.S. Crawford has been promoted to Professor and Chairman of the Department. Assistant Professors Bradshaw, Robinson, and Ward have been promoted to Associate Professors; Mrs. T. Cardwell and Miss P. Faris to Assistant Professors.

New Appointments are Associate Professor—Dr. K.A. Sowden, Associate Professor and Director of the Department of Rehabilitation Medicine at Sunnybrook Hospital; Assistant Professor—Dr. M. Stoicheff and Miss C. Rickards; Lecturer—Miss S. Henderson and Mrs. M. Marshall.

PUBLICATIONS

Godfrey, C.M. "Volunteers in the Department of Rehabilitation Medicine of the Wellesley Hospital" (*The Volunteer*, Oct. 1971, pp. 2–4)

Godfrey, C.M. and Douglass, E. "Recovery Process in Aphasia"; in *Selected Readings*, by Martha Taylor Sarno, pp. 316–69

SURGERY

Under the direction of Professor W.R. Drucker

ACADEMIC VISITORS

The Department has received the following academic visitors over the past year: Mr. A.S. Aldis, from the Welsh National School of Medicine, Cardiff; Dr. W.B. Bean, from the University of Iowa; Dr. David Blumenstock, from the Columbia University Medical School, New York; Professor J.C. Callaghan, from the University of Alberta was a visitor to the Division of Cardiovascular Surgery; Dr. R.E. Carroll, from Columbia University, New York, was a visitor to the Division of Orthopaedic Surgery; Dr. W. Carter, from St. John of God Hospital, Ballarat, Australia, was a visitor to the Division of Orthopaedic Surgery; Mr. C.T. Collins, from the New Zealand Division of the Royal Australasian College of Surgeons was a visitor to the Division of Thoracic Surgery; Dr. Harvey Crystal, from University of Southern California, was a visitor to the Division of General Surgery; Dr. M. De Benedetti, from California was a visitor to the Division of Orthopaedic Surgery; Dr. E. Eikelaar, from Grescinger, Holland, was a visitor to the Division of Orthopaedic Surgery; Dr. Alfonso Escobar, from the University of Mexico was a visitor to the Division of Neurological Surgery; Dr. H.C. Grillo, from the Massachusetts General Hospital in Boston was a visitor to the Division of Thoracic Surgery; Mr. A.J. Gunning, from the Nuffield Foundation Research

Institute, Oxford, England, was a visitor to the Division of Thoracic Surgery; Dr. Hsien-Wen Ha, from Jih Tan Hospital, Academy of Science, Peking; Mr. Malcolm Hay, from Birmingham Accident Hospital, Birmingham, England, was a visitor to the Division of Orthopaedic Surgery; Dr. J. Robinson Hicks, from Charlotte Rehabilitation Hospital, Charlotte, N. Carolina, was a visitor to the Division of Orthopaedic Surgery; Dr. C.A. Hiebert, from Tuft's University was a visitor to the Division of Thoracic Surgery; Dr. Hoogmarten, from Belgium was a visitor to the Division of Orthopaedic Surgery; Mr. O.J. Vaughan-Jackson, from Memorial University, Newfoundland, was a visitor to the Division of Orthopaedic Surgery; Professor A.W. Kay, from the University of Glasgow, Scotland; Dr. H.E. Kleinert, from University of Louisville was a visitor to the Division of Orthopaedic Surgery; Dr. C.M. Leevy, from the College of Medicine & Dentistry of New Jersey, was a visitor to the Division of General Surgery; Dr. P.A. Limbers, from Sydney, Australia, was a visitor to the Division of Orthopaedic Surgery; Mr. W.A.A.G. MacBeth, from the University of Otago, Dunedin, New Zealand; Dr. W.P.G. Main, from the National Hospital for Nervous Diseases, London, England, was a visitor to the Division of Neurological Surgery; Dr. R.M. McFarlane, from University of Western Ontario was a visitor to the Division of Orthopaedic Surgery; Dr. Angus McLaughlin, from the University of Western Ontario was a visitor to the Division of General Surgery; Dr. Rene Megavard, from the Geneva School of Medicine, Switzerland, was a visitor to the Division of Thoracic Surgery; Dr. L.W. Milford, Jr., from University of Tennessee was a visitor to the Division of Orthopaedic Surgery; Dr. Henry Miller, from the University of Durham, England, was a visitor to the Division of Neurological Surgery; Dr. C.B. Mueller, from McMaster University, Hamilton; Dr. D.D. Munro, from the Royal Victoria Hospital, Montreal, was a visitor to the Division of Thoracic Surgery; Dr. V.L. Nickel, from the University of Southern California, was a visitor to the Division of Orthopaedic Surgery; Dr. A.J. Phillips, from the Canadian Cancer Society was a visitor to the Division of General Surgery; Dr. J.C. Randolph, from the Children's Hospital of the District of Columbia, Washington, D.C.; Professor Andrew Roger, from the University of Oxford, England, was a visitor to the Division of Neurological Surgery; Dr. H.W. Scott, Jr., from Vanderbilt University, Nashville; Dr. Thomas Sears, from the National Hospital for Nervous Diseases, London, England, was a visitor to the Division of Neurological Surgery; Dr. Michael Sullivan, from the Royal National Orthopaedic Hospital, London, England, was a visitor to the Division of Orthopaedic Surgery; Dr. Sidney Sutherland, from the University of Melbourne, Australia, was a visitor to the Division of Neurological Surgery; Dr. F.J. Veith, from the Montifiori Hospital, New York City, was a visitor to the Division of Thoracic Surgery.

In addition the following groups visited the Department of Surgery: The Academic Plastic Surgery Forum visited the Division of Plastic Surgery. The Academy of Orthopaedic Surgeons of France sent thirteen representatives to visit the Division of Orthopaedic Surgery. The Harvenian Society visited the Division of Cardiovascular Surgery.

The following group visited the Division of Orthopaedic Surgery in connection with a special programme on Rehabilitation: Dr. Paul Brand, from Louisiana; Dr. Dillwyn Evans, from Cardiff, Wales; Dr. John Golding, from Jamaica; Dr. J.E. Hall, from Boston Children's Hospital; Dr. Vert Mooney, from University of Southern California; Dr. C.S. Neer, II, from Columbia Presbyterian Medical Center, New York.

RESEARCH

Cardiovascular Surgery (Dr. W.G. Bigelow, Chairman)

Dr. W.G. Bigelow with the assistance of Dr. John Bailey has extended his clinical research regarding heart valve replacement by developing two special heart valve clinics. Dr. B.S. Goldman with Dr. Wolf Lixfeld continued his experimental research into the nature of rejection in heart transplantation. This work is part of an inter-departmental team project with the departments of Medicine and Pathology. With

Dr. Lloyd Black reviewed 20 years' experience in surgery for patent ductus arteriosus at the General Hospital. Dr. R.O. Heimbecker with Dr. K. Richards continued his experimental work on decompression air sickness and his studies on heart function following transplantation in dogs and calves. He has developed a new interesting experimental model to study the clinical condition caused by coeliac artery obstruction. Dr. J.A. Key is studying the results of surgery for abdominal aortic aneurysms. Dr. D.C. MacGregor continued the experimental study of anoxic arrest of the heart and initiated interesting research into the effect of Bretylium in improving the tolerance of animals to low body temperature. Dr. W.T. Mustard in association with Dr. Kanzaki spent the year working very hard on an operation for right ventricular bypass in dogs. This operation was to be directed towards the treatment of tricuspid atresia. Dr. A.S. Trimble with Dr. F. Metni carried out valve replacement using fascia lata from the thigh in 53 patients. He organized the first World Round Table Conference on Fascia Lata Valve Replacement in November 1970 in Toronto. With the cardiologists he studied the importance of left ventricular function in the selection of patients for coronary artery surgery. Dr. G.A. Trusler has been studying a method of controlling aortopulmonary anastomoses in pigs. He has also made a clinical follow-up study of children with cavopulmonary anastomosis, and a clinical follow-up study of children following pulmonary artery banding. Dr. J.K.Y. Yao has made a clinical and haemodynamic follow-up study of patients after aortic valve replacement, and is studying factors that might influence formation of collateral circulation in the hearts of pigs made ischemic by coronary artery constriction.

General Surgery (Dr. N.A. Watters, Chairman)

Dr. K.D. Bury is conducting a laboratory study of physiologic adaptation including fluid and electrolyte transport following massive intestinal resection in small animals. She has instituted a clinical research programme at the Wellesley Hospital, including metabolic studies in patients on intravenous hyperalimentation or oral chemically formulated diets, and a perfusion study of intestinal absorption after various surgical procedures. Dr. Marvin Deitel is conducting a clinical, radiologic, and anatomic (post-mortem) study of rotations of the stomach. He is also studying the management of nutritional problems in surgical patients. Dr. W.R. Drucker, with Dr. G. Farago and Dr. T. Lau, has continued his studies of the metabolic alterations that occur with persisting hypovolemic shock. Dr. Farago is currently working on the change in perfusion rate and capillary transport in adipose tissue. Dr. Lau is finishing his work on insulin secretion, now using a new specimen (primates) and is collaborating with the Department of Physiology on a technique to study the influence of insulin on peripheral uptake of glucose during shock. Dr. R.E. Falk has made progress in assessing the cell mediated immune response in patients who have had a renal transplant. Their response has been monitored on transplantation antigens, utilizing an *in vitro* technique. It has been possible to determine the development of immunity prior to damage to the target organ. A technique to stimulate human lymphocytes to make antibody in tissue culture has been developed. This technique has a large variety of potential applicants who are currently being assessed. Its application to autoimmune diseases, neoplasia, and transplantation is presently being developed. Dr. Hiraki with Dr. Givan is involved with research on wound infections following gastric surgery. He is also studying the relationship of pancreatic function to the development of atherosclerosis (hardening of the arteries) in collaboration with Dr. Sims, Department of Laboratories. Dr. I.H. Koven has undertaken studies on interstitial fluid changes and alterations in diffusion during low flow states, the metabolic alterations during haemorrhagic shock and the effect of intravenous hyperalimentation on alterations in body water. In collaboration with Drs. C. Ezrin and G. Steiner studies on the effect of treatment of obese patients with thyroxine have been completed. Dr. R.E. Louch is making a clinical study of coeliac artery stenosis. He is also involved with work on hepatic artery reconstruction, the assessment of *emergency* porto-caval shunts for variceal bleeding secondary to portal hypertension, and acute arterial trauma. Dr. J.A. McIntyre is continuing his

study of results after partial gastrectomy, vagotomy and pyloroplasty, and vagotomy and gastroenterostomy. Comparison of complications, morbidity, mortality, post-operative satisfaction rate and recurrent ulcer rate when performed for duodenal ulcer diathesis. With Dr. Ian Sanderson, he is also studying food bolus obstruction. Dr. R.I. Mitchell is continuing his clinical research into the staging of Hodgkin's Disease by laparotomy in conjunction with Dr. Vera Peters and Dr. Tom Brown. Dr. J.E. Mullens has been carrying out investigations in the field of oesophageal motility and gastric secretion with pentagastrin. Dr. J.L. Provan is studying the role of 1-125 fibrinogen in the diagnosis of venous thrombosis. He is also making electromagnetic flowmeter studies as part of a clinical investigation determining the effectiveness of reconstruction of the profunda femoris artery. Blood-flow measurements are made on all patients undergoing reconstructive surgery for lower limb atherosclerosis. Dr. I.B. Rosen has made an assessment of the diagnostic use of echography in thyroid tumours. Dr. R.L. Ruderman has undertaken studies in the cause of gastric hyperacidity produced by jejunectomy in the rat and studies in bile changes in rabbits on a lithogenic diet. Dr. S.M. Strasberg is continuing investigations begun in Boston, on the effect of elevated biliary tract pressure on bile flow and composition and on the effect of different types of biliary tract obstruction (partial, intermittent, unilateral) on bile flow and composition. In addition, he is developing a physiologic sampler which allows sampling of bile or any other organ effluent in a representative manner under sterile conditions and under conditions of controlled pressure.

Neurological Surgery (Dr. T.P. Morley, Chairman)

Dr. E.B. Hendrick, in collaboration with Dr. W. Zingg, has studied the development of a model of head to test stress factors in design of hockey and ski racing helmets. Dr. H.J. Hoffman has studied the use of an implanted pressure transducer in patients with cerebral oedema, and (in collaboration with Professor D.F. James of the Department of Mechanical Engineering) improvement in design and application of CSF shunts. Dr. W.J. Horsey, in collaboration with Dr. H. Berry, has investigated cortical-evoked potentials in patients with neurological lesions. Dr. A.R. Hudson, in collaboration with Professor D. Kline of New Orleans, is investigating degeneration and regeneration in partial nerve injury and the electronmicroscopic changes in spinal cord regeneration. Dr. R.P. Humphreys, together with Drs. E.B. Hendrick and H.J. Hoffman, has studied the development of retrospective and prospective protocols for computer analysis of hydrocephalus survey. Dr. K.E. Livingston, in collaboration with Dr. H.B. Kedward (Clarke Institute), has made studies of therapeutic innovations in the management of chronic or recurrently hospitalized psychiatric patients. Dr. W.M. Loughheed is investigating the electrocoagulative anastomosis of small vessels and is continuing analysis and updating of the aneurysm (1000 cases) and endarterectomy (500) register. Dr. T.P. Morley, in collaboration with the other neurosurgical services and Professor Simpson from the Department of Radiology, has continued the controlled clinical trial of the use of radiation in the treatment of brain tumours. Dr. R.R. Tasker has assessed the effect of stereotactic lesions in the various cerebellar nuclei on alterations of muscle tone and on experimentally induced dyskinesia, as recorded by EMG and integrated EMG records. With Dr. L.W. Organ the effect of electrical stimulation is being mapped in cord and brainstem in the course of percutaneous cordotomy and stereotactic operations. Dr. C.H. Tator has been continuing his studies of chemotherapeutic agents and diagnostic tracers in experimental brain tumours, and is investigating experimental primate cord injury. In collaboration with Dr. W. Wassenaar, he has been testing the use of ^{99m}Tc technetium cysteine in clinical brain scanning. Dr. R.G. Vanderlinden, in collaboration with Dr. K.E. Livingston, is using previously established "pain model" to study the effects of diphenylhydantoin on somatosensory evoked potentials. With Dr. R. Ghee of the Department of Medicine, he has made a study of computerized evoked EEG potentials in patients with implanted neurostimulator electrodes or during percutaneous cordotomy.

Orthopaedic Surgery (Dr. F.P. Dewar, Chairman)

Dr. T.W. Barrington, with Dr. D.V. Hoffman, is engaged in a study of cervical disc space infections, and in a clinical review of the value of Chiari osteotomy for unstable hips. Dr. W.P. Bobechko is involved in a basic research problem regarding auto-immune reactions of articular cartilage, especially the immunological response to articular cartilage when being destroyed by septic arthritis. He is also involved in clinical studies on the development of a spinal muscle stimulator to alter the pattern of scoliosis, the review of the long-term result of infantile scoliosis fusions, and a study to determine the value of continued skull traction in the pre-operative period in scoliotic patients. Dr. N.C. Carroll is involved in a biomechanical study of an orthotic device for the assistance of children with severe neuromuscular handicaps, and is also involved in a long-term clinical follow-up of children with resistant club feet. Dr. D.C. Evans is continuing his investigation of the value of cryosurgery for the treatment of malignant disease in bone, and is investigating the use of staples in the treatment of recurring dislocations of the shoulder. Dr. J.G. Evans is carrying out clinical research related to Charcot's joints: avascular necrosis complicating intertrochanteric fractures; and the influence of dietary phosphate in the healing of fractures. Dr. R.H.N. Fielden is carrying on a continuing study of the influence of compression apparatus in the healing of fractures; and the value of instant-fit prostheses for amputation. Dr. R. Gillespie is involved in four clinical research problems: a study of development of early curves in idiopathic scoliosis, an analysis of neurological deficits in congenital scoliosis, a review of diastematomyelia associated with scoliosis, and orthopaedic aspects of Caffey's Disease in children. Dr. J.D. Graham, in association with Professor Mills of the Department of Civil Engineering, has continued his investigations of the mechanical properties of the articular cartilage and the theory of lubrication of articular cartilage. Dr. W.R. Harris, with Dr. R. Hornby and Dr. J.P. Kostuik, is involved in clinical research on the development of a simple transducer for the measurement of pressure distribution in lower-extremity amputations, investigation of radioactive Xenon clearance from the skin as a means of predetermining the optimum level of amputation in patients with vascular disease, and a follow-up study of Syme's amputations. Dr. D.E. Hastings, in collaboration with Dr. J.A. Evans, is involved in clinical study of the relationship of ulnar drift of the fingers to deformity in the rheumatoid wrist, and a review of 100 consecutive cases of total hip replacement. In association with Dr. Stuart Brash, he is undertaking clinical studies of the development of an assessment to assist in evaluation of patients with rheumatoid deformities involving joints, an improved method of stabilization of the rheumatoid wrist, and the development of a device for testing the integrity of the ligaments of the knee. Dr. G.A. Hunter, with the Renal Dialysis Unit, is involved in the study of orthopaedic complications that arise during treatment; he is interested in haemophilia; and has reviewed the known infections associated with total hip surgery in all hospitals active in this type of surgery in Toronto. Dr. R.W. Jackson is involved in two basic research projects: one on fracture healing and the influence of phosphate supplementation and deprivation in the formation of callus, and the other a study of the influence of microwave energy upon the RNE factor in cells exposed to this energy. Observations were made with an electron-microscope. He is also investigating two biomedical projects: one being a study of a new form of bone adhesive or cement, zinc polycarboxylate, with relation to its acceptance and its degradation, and the other the development of a total surface replacement prosthesis for the treatment of arthritic knees. Dr. J.P. Kostuik, in association with Dr. James Israel, has completed a clinical research survey of 150 cases of adult scoliosis. This work will be somewhat unique and will lead to an important publication. He has also continued his basic research on the development of transcutaneous interosseous implants for amputees, and is developing a telemetry system for the analysis of force in the stance phase of gait in amputees. Dr. J.G. Lloyd is continuing investigation of patients being treated in the Renal Unit by the methods available for examining undecalcified sections of bone, and this is correlated with

data available from the other disciplines. He is also undertaking an investigation of the possible use of a torque screwdriver for measuring the power of the forearm. A group of normal individuals have been compared with patients who suffered a Colles fracture. Dr. Ian Macnab has continued his biomechanical investigations into the value of fibrous composites as surgical implants, and the bonding properties of porous surfaced metallic implants to bone when placed under physiological stress, in this instance staples, and the use of porous surfaced implants to replace osseo-cartilagenous defects in joints. He is also involved in an important orthotic research, namely, fibreglass reinforced carrier base for plaster of par bandages. Dr. J.A. McCulloch, in association with the Department of Anatomy, is pursuing his study of bone and joint anatomy; he is also involved in a study of chymonucleolysis and disc disease. Dr. G.A. McDonald, with Dr. G.G. Dale, has undertaken a discotomy review. Dr. G.F. Pennal, together with Drs. G.A. McDonald and G.G. Dale, has undertaken a follow-up review on total hip arthroplasty. He has also done a follow-up review of non-mirror fractures of the pelvis; and aneurysmal bone cysts (National Survey). He has studied fractures of os calcis – results of subtalar fusion and motion infero-tibio-fibular joint motion function. Dr. Mercer Rang undertook a biomechanical study of the influence of the subtalar joint on static foot posture, a clinical study related to the effect of surgical procedures on the lower limb in patients with cerebral palsy, and a clinical study to determine the incidence of fat embolism in children. Dr. R.B. Salter, with the assistance of Dr. David Simmonds, is investigating the role of the synovial membrane in the healing of joint capsule, and is also carrying on a clinical investigation with Dr. Pompe Vanmeerdervoort of the genetic factors and the etiology of Legg-Perthes' Disease. Dr. J. Schatzker is involved in a biomechanical study of the influence of bone cement on articular cartilage, and a study of holding powers of screws in bone. He is also involved in the clinical research problem related to the value of intertrochanteric osteotomy in the treatment of osteoarthritis of the hip and an investigation into the methods of treating supracondylar fractures of the femur. Dr. E.H. Simmons, with Dr. E.H. Flowers, has completed a clinical and radiographic assessment of cavo varus feet deformities. In conjunction with Dr. I.H. Harrington and Mr. A. Christian, he is investigating a new form of total replacement arthroplasty for the knee joint and, with Dr. C.M. Segil, he has completed a clinical assessment of the indications for and results of chemonucleolysis in disc disease, and a clinical study of the value of discograms. Dr. Marvin Tile, with Dr. Stanley Gertzbein, Dr. Allan Gross, and Dr. R. Falk, is studying autoimmunity in relation to disc disease. With Dr. Gertzbein and Dr. Hugh Little, he has produced adjuvant arthritis in the knees of rats and is using these animals to investigate the influence of rheumatoid arthritis upon various previously produced neurological lesions. Dr. A.M. Wiley has investigated the progress and treatment of the rheumatoid hand in the Metro Toronto district. Working with Dr. E. Kosinka, he has undertaken research work in connection with the transplantation of articular cartilage, latterly with the inauguration of a deep-freeze bank for major fragments of bone. He has made a study of operating-room infections, and has investigated the incidents of pulmonary embolus in the post-operative patient. Dr. C. Zaltz is involved in a prolonged retrospective and prospective study in the treatment of complicated fractures of the tarsus; and is in charge of the surgical rehabilitation of certain rare neuromuscular disorders.

Plastic Surgery (Dr. W.K. Lindsay, Chairman)

Dr. L.G. Douglas (in conjunction with Dr. W.R.N. Lindsay) is studying the biological effects of lyophilized human skin on burns and the mechanism of injury and complications in the treatment of maxillo-facial trauma. Dr. L.G. Farkas is studying the biology of silicone rod prepared tendon sheaths and the fate of free tendon grafts subsequently placed in them (in conjunction with Dr. W.K. Lindsay), anthropologic changes in lateral facial dysplasia patients, multiple factors affecting the experimental burn wound, and the fate of free grafted composite tissues as an extension of his animal work in reconstructing tracheal defects. Dr. A. Freiberg has completed retrospective studies on finger-tip injuries, the management of stasis ulcers and hand infections with

emphasis on the appropriate selection of antibiotics (in conjunction with Dr. J. Waddell). Dr. R. Knowlton is studying methods of reconstructing the eyelids, using cartilage grafts and other measures, including the preparation of two movie films. Dr. W.K. Lindsay is studying the changes in the alveolus and maxilla following neonatal maxillary orthopaedics, lip and palate repair in cleft lip-cleft palate patients. Dr. W.R.N. Lindsay is completing a study of modes of recovery in various sensory defects of the hand and is carrying out a series of replantation experiments to assess changes contributing to survival of replanted limbs and to study the problem of homotransplantation in replanted limbs. Dr. E.P. McDougall is continuing a study of reconstructive methods suitable for paralytic hands, including production of a movie film. Dr. I.R. Munro is completing a re-analysis of all aspects of the burn problem in children, a detailed study (in conjunction with Dr. R. Bannantyne) of the effects of gentamicin on the burn patient and wound, the role of early excision in certain burns, and a detailed study of the indications for the technique and results of radical craniofacial surgery (in conjunction with Dr. H.J. Hoffman). Dr. J.F. Murray is studying children with unilateral congenital absence of the hand and the prosthetic devices used for these conditions, and methods of reconstructing the lower lip and methods of thumb reconstruction, the latter involving a film production. Dr. H.G. Thomson is studying methods of photogrammetric analysis of facial deformities (in conjunction with Mr. A. Wright), the fate of the nasal floor in cleft-lip patients, the use and abuse of the tourniquet in extremity surgery, the fate of the hamuli in cleft-palate patients, the fate of free autografts in preformed silastic pseudosheath pockets, and the syndromes of lateral facial dysplasia.

Thoracic Surgery (Dr. F.G. Pearson, Chairman)

Dr. R.J. Ginsberg is studying the bronchial arterial circulation, using a resin casting technique which he developed with Dr. Gordon Cumming in Birmingham, England, during his McLaughlin Travelling Fellowship. Dr. R.D. Henderson continued research into the mechanisms responsible for the control of reflux with particular attention to the mechanisms in Collis gastropasty. He made a study of the role of bile and acid in the production of peptic esophagitis and the motor defect associated with peptic esophagitis, and a study of the effects of bile and acid on the rabbit lung. Dr. Henderson is also making a prospective clinical study of the symptomatology of hiatus hernia, a manometric and clinical study of pharyngo-esophageal function in hiatus hernia and a manometric and clinical study on the effects of recurrent laryngeal nerve division on pharyngo-esophageal function. Dr. F.G. Pearson made an experimental study of the changes in muco-ciliary clearance (using tantalum bronchography) and gas exchange (differential bronchspirometry) following broncho-pulmonary resection in the dog, comparing simple lobectomy, lobectomy with sleeve resection of the bronchus, and simple lobectomy with phrenic nerve division. He is making a continuing study of muco-ciliary clearance in the transplanted canine lung, and a continuing prospective study of the incidence of tracheal injury and stenosis following cuffed tube intubation in patients at Toronto General Hospital. Dr. G.A. Taylor is studying the influences of antiplatelet serum, reptilase, and brinase on the hyperacute rejection of canine renal allografts; this is an attempt to modify hyperacute allograft rejections by altering coagulation with use of antiplatelet serum, reptilase, and brinase. He is also making a study of the effects of shock (hypovolemic, endotoxic, and thrombinaemia). The response will, it is hoped, be altered by antiplatelet serum, reptilase, and brinase.

Urological Surgery (Dr. C.J. Robson, Chairman)

Dr. M. Barkin is continuing his studies on graft survival by donor treatment. Dr. P.O. Crassweller, together with Dr. G. Cook, is continuing research activity in the clinical investigation into renal transplantation and, together with Dr. Oreopoulos of the Department of Medicine, into recurrent renal calculus disease. He also has initiated a long-term follow-up on the ruptured urethras in conjunction with fractured pelves, a study which is embracing the Toronto Western Hospital, the Toronto General Hos-

pital, and St. Michael's Hospital. Dr. V. Colapinto is doing further research on the haemodynamics in transurethral prostatectomy. Dr. G.A. Farrow has studied renal transplantation in the rat; and developed a technique of autotransplantation of the rat kidney, using the vena cava and aorta; autoregulation of renal blood flow in the transplanted kidney to determine the effects of hypothermia and hyperbaric oxygen preservation techniques; and made a clinical review of human cadaver transplants in conjunction with the Division of Nephrology, Department of Medicine. Dr. R.D. Jeffs is conducting a study of vaginal and perineal flora in relation to recurrent cystitis in children, and is pursuing a clinical assessment of the urinary tract in newborn meningocele. Dr. A.G. Keresteci and Dr. J. Rankin are continuing a laboratory study on nerve stimulation of the canine bladder. Dr. W.K. Kerr is studying carcinogenic implications of I.N.H. induced B₆ deficiency in T.B. patients. Dr. C.J. Robson, in conjunction with Professor H. Kunov of the Department of Bio-medical Electronics, is continuing research on the electrical stimulation of the canine bladder. Dr. J.L.T. Russell has two clinical research projects underway, one on the results of radical total prostatectomy for carcinoma of the prostate, and the second, in collaboration with Dr. Struthers, a further review of urinary tract diversions. Dr. N.W. Struthers has devised an experimental model for determining drug effects on the canine ureter and renal pelvis.

HONOURS

DR. W.P. BOBECHKO, 1971 American-British-Canadian Travelling Fellow to Great Britain.

DR. K.D. BURY, awarded the F.N.G. Starr Memorial Graduate Scholarship.

DR. M. DEITEL, elected Chairman, Section of Surgery, Academy of Medicine, Toronto.

DR. F.P. DEWAR, first visiting professor: Division of Orthopaedic Surgery, University of Montreal.

DR. W.R. DRUCKER, elected Governor of the American College of Surgeons; elected Councillor of the Central Society for Clinical Research; elected member of the Association of Surgeons of Great Britain and Ireland; founding member of American Trauma Society; Visiting Professor at University of Rochester, New York; Visiting Professor at Catholic Medical Center of Brooklyn and Queen's, New York City; Visiting Professor at Roanoke Memorial Hospitals, Roanoke, Virginia.

DR. R.E. FALK, Visiting Professor, McGill University; Visiting Professor, University of Manitoba.

DR. W.R. HARRIS, official visitor to Division of Orthopaedic Surgery, University Hospital, Edmonton; Visiting Professor, University of Saskatchewan.

DR. E.B. HENDRICK, Visiting Professor, University of California Medical School, San Francisco.

DR. R.W. JACKSON, special guest, National Academy of Sciences, Charlottesville, Virginia.

DR. W.K. KERR, elected President, Canadian Academy of Urological Surgeons.

DR. W.R.N. LINDSAY, President, Canadian Society of Plastic Surgeons.

DR. K.E. LIVINGSTON, elected Chairman, Programme Committee, 3rd International Congress of Psychosurgery at University of Cambridge.

DR. W.M. LOUGHEED, Visiting Professor to Dartmouth Medical School, New Hampshire.

DR. I. MACNAB, awarded the Eduard Sampson Award of the Canadian Orthopaedic Association (with Dr. Peter Welsh).

DR. T.P. MORLEY, elected President, Canadian Neurosurgical Society and Canadian Congress of Neurological Sciences.

DR. R.A. MUSTARD, elected President, National Cancer Institute of Canada.

DR. C.J. ROBSON, elected member of the Nucleus Committee, Urological Surgery, Royal College of Physicians and Surgeons of Canada.

DR. R.B. SALTER, awarded Honorary Fellowship, American Academy of Orthopaedic Surgeons; elected to Council of the Royal College of Physicians and Surgeons of Canada; Visiting Professor, University of Alberta; Visiting Professor, University of Colorado; 1972 George Packard Memorial Lecturer, Denver.

DR. E.H. SIMMONS, elected President, Medical Legal Society of Toronto; official guest, Atlantic Provinces Orthopaedic Society; official guest, South African Orthopaedic Association, Johannesburg, and International Conference on Accident Prevention, Johannesburg.

DR. N.A. WATTERS, Visiting Professor, University of Calgary.

SCHOLARLY ADDRESSES

DR. M. BARKIN, "Post operative Vesical Disfunction," Royal College of Physicians and Surgeons of Canada, Toronto.

DR. W.P. BOBECHKO, "Complex Hip Problems in Childhood," American Academy of Orthopaedic Surgeons, Atlanta; "Orthotics in Cerebral Palsy," American Academy of Cerebral Palsy, New York.

DR. K.D. BURY, "Chemically Formulated Diets," Symposium on Parenteral Nutrition, Past, Present & Future, Bermuda; "Carbohydrate Absorption and Disaccharidase Activity Following Massive Intestinal Resection," American College of Surgeons, Atlantic City; "Reversal of Colonic Net Absorption to Net Secretion Following Increased Intraluminal Pressure," Royal College of Physicians and Surgeons of Canada, Toronto.

DR. N.C. CARROLL, "Orthotic Devices for Children with Neuromuscular Handicaps," American Academy of Cerebral Palsy, New York.

DR. M. DEITEL, "The Physician and a Nutritional Intravenous Programme" and "Current Concepts of Parenteral Therapy," Canadian Society of Hospital Pharmacists, Toronto, Kingston, Saskatoon, Ottawa, and Halifax; "I.V. Hyperosmolar Alimentation," Ontario Medical Association, Toronto; "Insulin Response in Patients on Prolonged Infusions of High Concentrations of Glucose and Amino Acids," Canadian Federation of Biological Societies, Quebec City.

DR. N.C. DELARUE, "Complementary Use of Angiography and Mediastinoscopy in Lung Cancer," International Cancer Congress, Houston; "Doctor: I coughed up blood," and "Team Approach to Management of Carcinoma," College of Family Physicians of Canada, Halifax; "Bronchiolo-Alveolar Carcinoma," Royal College of Physicians and Surgeons of Canada, Ottawa; "The Function of a Smoking Withdrawal Study Center," International Conference on Smoking and Health, London; "The Use of Angiography and Mediastinoscopy in the Investigation of Lung Cancer," Granville Conference, Granville, Ohio; "Adrenalectomy in Metastatic Mammary Carcinoma," Seminar on Breast Cancer, Springfield, Mass.; "Clinical Studies in the Realm of Tumor Biology," Royal College of Physicians and Surgeons of Canada, Toronto.

DR. W.R. DRUCKER, "The Effect of Persisting Hypovolemic Shock on Pancreatic Output of Insulin," Symposium on Neurohumoral and Metabolic Aspects of Injury, Budapest; "Surgeon and Dean," Surgical Biology Club II, Atlantic City; "Challenges to Energy Metabolism During Hemorrhagic Shock," University of Rochester; "Renal Abnormalities Accompanying Shock," Catholic Medical Center, New York City; "Fluid and Electrolyte Balance in the Post Operative Period" and "Shock Models and the Age of Confusion," Trauma Symposium, Banff; "Some Concepts of Colitis - Immunosuppression," American College of Surgeons Sectional Meeting, Philadelphia; "Current Concepts of Shock," Roanoke Memorial Hospitals, Roanoke; "The Influence of Changing Patterns of Health Care on Medical Education," University of Virginia, Charlottesville; "Health Care in Medical Education - A View from the North," Medical College of Wisconsin, Milwaukee; "Alterations Produced by Hemorrhagic Shock," Academy of Medicine, Milwaukee; "Surgical Shock: New Thoughts on an Old Problem," American College of Surgeons, Virginia Chapter, Williamsburg.

DR. S. EIN, "Vaginal Construction in Female Children with an Absent Vagina

and Imperforate Anus," Canadian Association of Paediatric Surgeons and Royal College of Physicians and Surgeons of Canada, Ottawa.

DR. R.E. FALK, "Assessment of Transplant Immunity," University of Ottawa; "An Antigen Specific Thymic Replacement Factor in the Rat," Hammersmith Medical School, London.

DR. G. FARAGO, "Effect of Hypovolemia on Fat Metabolism," Federation of the American Societies for Experimental Biology, Atlantic City; "Free Fatty Acid Metabolism in Hemorrhagic Shock," Symposium on Neurohumoral and Metabolic Aspects of Injury, Budapest.

DR. G.A. FARROW, "Autotransplantation for Renovascular Hypertension," Canadian Urological Association, Halifax; "Electron Microscopy in Adynamic Segment of the Ureter," American Urological Association, Northeastern Section, Freeport.

DR. R. GILLESPIE, "Septic Arthritis in Childhood," Canadian Orthopaedic Association, Jasper; "Orthotics in Scoliosis," International Symposium on Orthotics, Dundee, Scotland.

DR. W.R. HARRIS, "Experimental Epiphyseal Injuries," South African Orthopaedic Association, Johannesburg, S. Africa.

DR. D.E. HASTINGS, "Metacarpal-Phalangeal Surgery in Rheumatoid Arthritis," Canadian Society for Surgery of the Hand, Jasper; "Double Hemiarthroplasty of the Knee" (16-mm movie), Royal College of Physicians and Surgeons of Canada, Toronto; "Double Hemiarthroplasty of the Knee in Rheumatoid Arthritis. A Review of 50 Consecutive Cases," Pan-American Orthopaedic Conference, Bermuda; "Double Hemiarthroplasty of the Knee" (sound-slide presentation), American Academy of Orthopaedic Surgeons, Washington, D.C.

DR. R.O. HEIMBECKER, "Current Status of Myocardial Revascularization" and "Ventricular Resection," American College of Cardiology, San Francisco; "Pulmonary Embolism," University of Western Ontario; "Surgery for Coronary Artery Disease," Dalhousie University; "Pulmonary Embolism," Quebec Surgical Association and the Academy of Surgery of Paris; "The Present Status of Pulmonary Embolism," Mone-dore Hospital, Paris; "Ventricular Resection," Surgical Academy of Paris.

DR. R.D. HENDERSON, "Bile and Motor Defect of Esophagitis," Association of Academic Surgery, Philadelphia; "Role of Bile and Acid in the Production of Esophagitis" and "Esophageal Causes of Aspiration," Royal College of Physicians and Surgeons of Canada, Toronto; "The Role of Bile and Acid in the Production of Esophagitis and the Motor Defect of Esophagitis," Society of Thoracic Surgeons, Dallas.

DR. E.B. HENDRICK, "Intracranial Sepsis," American Association of Neurological Surgeons, Houston; "Depressed Fractures of the Skull in Infancy," Congress of Neurological Surgeons, Miami; "Shunt Procedures in Hydrocephalus" and "Craniosynostosis, Surgical Treatment" and "The Treatment of Epilepsy by Hemispherectomy," University of California and American College of Surgeons, San Francisco.

DR. W.J. HORSEY, "Visual Field Patterns in Chiasmal Compression," Canadian Congress of Neurological Sciences, St. John's, Newfoundland.

DR. A.R. HUDSON, "Electron Microscopy of Peripheral Nerve Autographs," Association for Academic Surgery, Philadelphia.

DR. R.W. JACKSON, "Gas Gangrene" (with Dr. J. Waddell), Canadian Orthopaedic Association, Jasper; "The Method of Cutting a Metal Prosthesis in situ" (with Mr. Henry Garside), Canadian Orthopaedic Association, Jasper; "Sexual Rehabilitation after Cord Injury," International Medical Society of Paraplegia, Stoke Mandeville, England.

DR. R.D. JEFFS, "The Role of Conservative Surgery Versus Urinary Diversion in the Treatment of Neurogenic Bladder due to Myelomeningocele," Academy of Paediatrics, Chicago; "Urinary Infection in Childhood" and "Urinary Incontinence in Children," University of Calgary; "The Dilated Ureter" and "Undescended Testicles," American Urological Association, Montreal.

DR. W.K. KERR, "Attempts to Induce Bladder Tumours with Tryptophan Meta-

bolites," International Conference on Bladder Tumour, Leeds, England; "Results of Radiotherapy and of Radical Surgery for Kidney Tumour," London Institute of Urology, London; "Epidemiology of Genito-Urinary Tuberculosis and Reconstructive Surgery," International Symposium on Genito-Urinary Tuberculosis, Homburg-Saar, W. Germany.

DR. J.P. KOSTUIK, "Transcutaneous Interosseous Implants – An Experimental Study," Canadian Orthopaedic Association, Jasper.

DR. I.H. KOVEN, "The Role of Interstitial Fluid Transport," Canadian Society for Microcirculation, Toronto; "The Improvement of Capillary Transport Capacity During Low Flow States," European Society of Experimental Surgery, Amsterdam; "Fluid and Electrolyte Management," Canadian Society of Hospital Pharmacists, Vancouver and Saskatoon.

DR. K.E. LIVINGSTON, "Tentative Limbic System Models for Certain Patterns of Psychiatric Disorder," International Congress of Psychiatry, Mexico City; "Physiological Studies of the Central Effects of Intravenous Procaine Hydrochloride," National Institute of Neurology, Mexico City; "Modern Concepts in Cortical Organization of Higher Intellectual Function, Including the Limbic Lobe," American Association of Neurological Surgeons, Boston.

DR. G.J. LLOYD, "Long Term Survival of Hyaline and Cartilage Grafts in Articular Surfaces" (with Drs. A.M. Wiley and M.H. Young), American Academy of Orthopaedic Surgeons, Washington, D.C.; "Bracing of Meningomyelocele Children" (presented on behalf of the Ontario Crippled Children's Centre), National Research Council Committee on Prosthetic Research and Development of Division of Engineering, Springfield, Mass.

DR. W.M. LOUGHEED, "Technique of Carotid Endarterectomy," American Academy of Neurological Surgery, Lake Tahoe; "Timing and Techniques for the Treatment of the Good Risk Patient with an Intracranial Aneurysm," American Association of Neurological Surgeons, Boston.

DR. D.L. MACINTOSH, "The Pivot Shift – A New Clinical Sign of Anterior Cruciate Insufficiency" (with Dr. R. Galway), Canadian Orthopaedic Association, Jasper; "Hermiarthroplasty Prosthesis in Advanced Arthritis of the Knee," La Société Belge d'Orthopédie et Traumatologie, Belgium.

DR. I. MACNAB, "Blood Supply of the Lumbar Spine," S. African Orthopaedic Association, S. Africa; "Occipito Cervical Lesions," International Congress on Trauma and Accident Prevention, S. Africa; "The Laminectomy Membrane" and "The Pathogenesis of Symptoms in Discogenic Back Pain" and "The Conservative Treatment of Fractures of the Tibia" and "Spondylolisthesis," the American Academy of Orthopaedic Surgeons, Washington, D.C.; "The Pathomechanics of Whiplash Injuries" and "The Conservative Treatment of Discogenic Back Pain" and "The Operative Treatment of Discogenic Back Pain," Pan-Pacific Surgical Association, Hawaii; "The Examination of the Neck" and "The Pathogenesis of Degenerative Cervical Disc Disease" and "Complications of Anterior Cervical Fusion" and "Soft Tissue Injuries of the Neck," The American Academy of Orthopaedic Surgeons, New York.

DR. L.J. MAHONEY, "Intra-arterial Infusion Chemotherapy for Primary Carcinoma of the Head and Neck," University Hospital, Djarkarta; "Intra-Arterial Infusion Chemotherapy," Care-Medico, Malaysia.

DR. J.E. MULLENS, "The Diagnosis of Dysphagia," and "The Treatment of Hiatal Hernia" and "The Management of Recurring High Ano-Rectal Fistulae," Deponegoro University, Semarang, Indonesia; "The Correlation of Radiography and Gastroscopy in the Diagnosis of Gastric Ulceration," Canadian Association of Radiology, Toronto.

DR. R.A. MUSTARD, "Surgical Treatment of Esophageal Hiatus Hernia," American College of Surgeons, Atlantic City.

DR. W.T. MUSTARD, "Surgical Therapy of Transposition of the Great Arteries," Sociedad Venezolana de Cardiología, Caracas.

DR. F.G. PEARSON, "Detection and Management of Tracheal Stenosis Following Cuffed Tube Tracheostomy," Society of Thoracic Surgeons, Dallas; "Primary Malig-

nant Tumours of the Trachea: A Clinical Review" and "Cardioid Adenoma of the Bronchus: A Clinical Review," Royal College of Physicians and Surgeons of Canada, Ottawa; "Treatment of Strictures of the Esophagus," American College of Surgeons, Sectional Meeting, Montreal; "Complications of Tracheostomy," American College of Surgeons, Atlantic City; "Carcinoma of the Lung – Latest Diagnostic and Therapeutic Measures," Phoenix Chest Disease Symposium, Phoenix; "The Role of Mediastinoscopy in the Selection of Treatment for Bronchial Carcinoma with Superior Lymph Node Involvement," American Association for Thoracic Surgery, Los Angeles.

DR. G.F. PENNAL, "Fractures of the Pelvis," American Academy of Orthopaedic Surgeons, Washington; "Fractures of Os Calcis," American Academy of Orthopaedic Surgeons, Washington.

DR. J.L. PROVAN, "Surgical and Traumatic Division of Lymph Trunks as a Cause of Limb Oedema," Canadian Society for Microcirculation, Toronto.

DR. M. RANG, "Problems in Children's Fractures," Canadian Association of Radiologists, Toronto; "Fractures of the Lower Limb in Children," North American Society for Roentgenology; "A Disappearing Osteosarcoma" and "The Hand in Cerebral Palsy" (with Drs. N. Carroll and R. Baker) and "Dislocation of the Hip in Trisomy 21," Canadian Orthopaedic Association, Jasper.

DR. C.J. ROBSON, "Results of Therapy for Carcinoma of the Prostate," Canadian Urological Association, Halifax; "The Function of Sympathetic Activity During Direct Detrusor Stimulation and Pelvic Nerve Stimulation in the Dog," Canadian Urological Association, Halifax; "Retroperitoneal Fibrosis" and "Carcinoma of the Prostate," American Urological Association, Montreal; "Injuries to the Ureter" and "The Surgery of Renal Tumors," University of New Mexico; "Carcinoma of the Prostate" and "Surgery of Hypernephroma," American Urological Association, S.W. Section, New Orleans.

DR. I.B. ROSEN, "Necrotizing Colitis," Royal College of Physicians and Surgeons of Canada, Toronto.

DR. R.B. SALTER, "The First Ten Years Personal Experience with Innominate Osteotomy in the Treatment of Congenital Dislocation of the Hip," International Course of Orthopaedics and Traumatology, Mexico City; "The Scientific Basis for Innominate Osteotomy in the Treatment of Legge-Perthe's Disease," Royal College of Physicians and Surgeons of Canada, Montreal; "Research Relevant to the Preventive Aspects of Degenerative Arthritis of the Hip" (Presidential Guest Lecturer), American Academy of Orthopaedic Surgeons, Washington. "The Prevention of Cubitus Varus Following Supracondylar Fracture of the Humerus in Children," Pan-Pacific Surgical Association, Honolulu; "A New Method of Iliopsoas Muscle Release for Hip Flexion Deformity in Cerebral Palsy," Canadian Orthopaedic Association, Quebec City.

DR. J. SCHATZKER, "Spinal Stenosis," Pan-American Orthopaedic Conference, Bermuda; "Fractures of the Tibial Plateau" and "Fractures of the Ankle," American Academy of Orthopaedic Surgery Course, Washington; "The General Principles and Guide Lines – the Treatment of Pseudoarthroses," Royal College of Physicians and Surgeons of Canada, Toronto; "The Surgical Anatomy and Techniques of the Mueller Total Hip Arthroplasty," Canadian Orthopaedic Association, Quebec City.

DR. E.H. SIMMONS, "A Clinical and Biomechanical Study of Anterior Spinal Instrumentation," Association of Bone and Joint Surgeons, Madrid; "Experience with the Dwyer Technique of Anterior Instrumentation of the Spine," Canadian Orthopaedic Association, Jasper; "The Surgical Correction of Flexion Deformity of the Cervical Spine in Ankylosing Spondylitis," Royal College of Physicians and Surgeons of Canada, Toronto; "An In-Depth Study of the Neck," American Academy of Orthopaedic Surgeons, New York City.

DR. B. SHANDLING, "Intestinal Haemangiomas in Children" (with Dr. J. Abrahamson), American Academy of Pediatrics, Chicago; "Oesophageal Atresia in the Under-Weight Baby: A Challenge," and "Rectal Biopsy for Hirschsprung's Disease," and "Gastric Tube Oesophageal Replacement," American Paediatric Surgery Association, Virginia.

DR. J. SIMPSON, "Oesophageal Replacement with a Reversed Gastric Tube in Children," Combined Canadian Association of Paediatric Surgeons and Royal College of Surgeons, Ottawa, and American College of Surgeons, Atlantic City; "Umbilical Hernia and Omphalocele," American College of Surgeons, Sectional Meeting, Montreal; "Conservative Management of Splenic Rupture" (with Dr. Gary Douglas), American Paediatric Surgical Association, Bermuda.

DR. C.A. STEPHENS, "Peptic Ulceration at the Hospital for Sick Children, Toronto, During the Twenty Year Period 1949-1969" (with Dr. C.G.F. Seagram and Dr. W.A. Cummings), American Academy of Pediatrics, Chicago.

DR. R.R. TASKER, "Anatomical Correlations of Detailed Thalamic Sensory Mapping in Man," International Society for Research in Stereotaxotomy, Freiburg; "Mapping of the Somatosensory Auditory Pathways in the Upper Midbrain and Thalamus in Man," Symposium on Neurophysiology in Man, Paris; "Percutaneous Cordotomy. Physiological Identification of Target Site," American Association of Neurological Surgeons, Boston.

DR. C.H. TATOR, "The Uptake of Tritiated Methotrexate by an Experimental Glioma," American Association of Neurological Surgeons, Boston, and Canadian Congress of Neurological Sciences, St. John's, Newfoundland, and Canadian Society for Clinical Investigation, and Academy of Medicine, Toronto; "Experimental Circumferential Compression Injury of the Primate Spinal Cord," U.S. Veterans Administration 18th Spinal Cord Injury Conference, Boston, and Royal College of Physicians and Surgeons of Canada, Toronto.

DR. G.A. TAYLOR, "Shock Lung," Canadian Thoracic Society, Halifax.

DR. M. TILE, "Fractures of the Forearm in Adults" (with Dr. D. Petrie), Canadian Orthopaedic Association, Jasper.

DR. G.A. TRUSLER, "Cavopulmonary Anastomosis," Canadian Cardiovascular Society, Ottawa.

DR. N.A. WATTERS, "The Management of Pilonidal Disease," Royal College of Physicians and Surgeons of Canada, Toronto, and "The Diagnosis of Colon Carcinoma," University of Calgary.

DR. A.M. WILEY, "Joint Transplantation," American Academy of Orthopaedic Surgeons, Washington, D.C.

DR. R.G. VANDERLINDEN, "Studies of Drug Effects on Central Pathways Conducting Pain," Canadian Congress on Neurological Sciences, St. John's, Newfoundland.

DR. J.K.R. YAO, "Current Status of Human Heart Transplantation," Academy of Medicine, Toronto; "Immunosuppressive Therapy in Heart Transplantation," Canadian Society of Hospital Pharmacists, Toronto, "Fascia Lata Aortic Valve Replacement," Ontario Medical Association, Toronto, and Tri-City Cardiovascular Society, Toronto; "Cardiac Surgery," University of the Philippines; "Current Status of Human Heart Transplantation," Philippine College of Surgeons; "Human Heart Transplantation," Velez Medical School.

DR. W. ZINGG, "Cardiogenic Shock During Rewarming Following Hypothermia in Dogs," Society for Cryobiology; "Adverse Effects of Veno-Arterial Shunting in Dogs," Canadian Physiological Society; "Shear Rate Dependent Changes in Blood Viscosity Caused by Hyperosmolar Plasma," Canadian Society for Clinical Investigation; "Studies on Laboratory Errors in Blood Viscosity Measurements," Canadian Society for Microcirculation; "Artificial Organs - Current Concepts and Future Potential," Department of Mechanical Engineering, University of Toronto, and Regina and Saskatoon Section, Canadian Society for Mechanical Engineering.

STAFF CHANGES

Retirement

Dr. C.K. Benson.

Resignations

Dr. W.R. Drucker, Dr. W.R. Tym.

Leave of Absence

Dr. J.R. Birch.

Promotions

To Associate Professor: Dr. W.R. Harris, Dr. C.T. Robertson. To Assistant Professor: Dr. D.A. Gibson, Dr. B. Goldman, Dr. R.D. Henderson, Dr. J.F. Murray, Dr. J.A. Palmer, Dr. H.G. Thomson, Dr. A.S. Trimble. To Associate: Dr. G. Farago.

New Appointments

Professor and Chairman of Department: Dr. D.R. Wilson. Associate: Dr. A. Bassett, Dr. J.D. Cooper, Dr. H. Schutz, Dr. L. Taranger. Clinical Teachers: Dr. M.S. Allen, Dr. F.M. Ameli, Dr. R.J. Knowlton, Dr. K. Petersen, Dr. E. Spratt.

The following doctors have been appointed for one year only. Within his home hospital the doctor concerned is either a Clinical Assistant or a Senior Fellow. None of the doctors listed receives any financial help from the Department of Surgery. Each is paid by the hospital concerned or from a grant.

Clinical Teachers: Dr. J. Bilyk, Dr. R. Gardere, Dr. A.J. Hall, Dr. G. Horne, Dr. F. Langer, Dr. S. Leete, Dr. S. McNeill, Dr. S. Parker, Dr. J. Rathbun, Dr. N. Russell, Dr. K. Stapleton, Dr. W.G. Williams.

PUBLICATIONS

- Barkin, M. "A Model for the Study of Hyperacute Renal Rejection" (*Investigative Urology*, vol. 9, 1972, p. 475)
- "Prolongation of Skin Graft Survival by Donor Treatment (Donor Enhancement)" (*Transplantation*, vol. 13, 1972, pp. 18–20)
- Bigelow, W.G. "Surgical Treatment of Coronary Heart Disease" (*Canadian Medical Association Journal*, vol. 104, no. 6, 1971, pp. 501–6)
- Birch, J.R. and Lindsay, W.K. "An Evaluation of Adults with Repaired Bilateral Cleft Lips and Palates" (*Plastic and Reconstructive Surgery*, vol. 48, 1971, pp. 457–65)
- Bobechko, W.P. *et al.* "Osteogenic Imperfecta" (*Journal of Bone and Joint Surgery*, vol. 53B, 1971, p. 72)
- Bury, K. "Disaccharidase Activity and Carbohydrate Absorption after Massive Intestinal Resection" (*Surgical Forum*, vol. 23, 1971, p. 673)
- Bury, K. *et al.* "Nutritional Management of Granulomatous Colitis with Perineal Ulceration" (*Canadian Journal of Surgery*, vol. 15, 1972, p. 108)
- "Use of an Elemental Diet in the Nutritional Management of Infant Catabolic Disease" (*American Journal of Surgery*, vol. 123, 1972, pp. 374–9)
- Carroll, N.C. *et al.* "Long-term Follow-up of Posterior Iliopsoas Transplantation for Paralytic Dislocation of the Hip" (*Journal of Bone and Joint Surgery*, vol. 54A, 1972, pp. 551–60)
- Connolly, J.G. *et al.* "Hydrolysis of Honvol by Bladder Mucosa Acid Phosphatase" (*British Journal of Urology*, vol. 63, 1971, p. 317)
- "Hydrolysis of Stilbestrol Diphosphate by the Acid Phosphatase of Bladder Mucosa" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 218–22)
- "Kinetics of H³ – Testosterone Metabolism in Patients with Carcinoma of the Prostate: Effects of Estrogen Administration" (*Acta Endocrinologica*, vol. 67, 1971, p. 733)
- "The Origin of Regenerating Bladder Mucosa after Partial Mucosal Stripping" (*Investigative Urology*, vol. 8, 1971, p. 481)
- Connolly, J.G., Mobbs, B.G. *et al.* "Effects of Aminoglutethimide on the Prostate Glands of Rats – A Preliminary Study" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 154–60)
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- Deitel, M. "An I.V. Hyperalimentation Cart" (*Surgery, Gynaecology and Obstetrics*, vol. 133, 1971, p. 1017)
- "Refractory Hypotension" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 337–44)
- *Use of Pharmacologic Doses of Solu-Medrol in Septic Shock* (two releases). Upjohn Laboratories, June and July 1971
- Deitel, M. and McIntyre, J.A. "Radiographic Confirmation of Site of Central Venous Pressure Catheters" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 42–52)
- Delarue, N.C. *The Toronto Smoking Withdrawal Study Centre. A Smoking and Health Research Report.* Ottawa: Department of National Health and Welfare 1971
- Delarue, N.C. *et al.* "Bronchioalveolar Carcinoma – A Reappraisal after 24 Years" (*Cancer*, vol. 29, 1972, pp. 90–7)

- Delarue, N.C., Pearson, F.G. *et al.* "Sputum Cytology Screening for Lung Cancer" (*Geriatrics*, vol. 26, 1971, pp. 133-5, 138-9, 143)
- Dewar, F.P., Carroll, N., Hall, J.E. *et al.* "The Semitendinosus Tenodesis for Recurrent Dislocation of the Patella" (*Journal of Bone and Joint Surgery*, vol. 54B, 1972, pp. 103-9)
- Drucker, W.R. "Problems and Solutions for Graduate Surgical Education in Canada"; in *The Structure and Support of Contemporary Residency Programs in Surgery, Transactions of the 31st Annual Meeting of the Allan O. Whipple Surgical Society*, ed. Harold G. Barber, p. 227. Springfield: Charles C. Thomas 1971.
- "Carbohydrate Metabolism: Traumatized versus Normal States"; in *Intra Venous Hyperalimentation*, ed. G.F.M. Cowan and W.L. Scheetz, p. 55. Philadelphia: Lea and Febiger 1972
- Ein, S.H. and Stephens, C.A. "Intussusception: 354 Cases in 10 Years" (*Journal of Pediatric Surgery*, vol. 6, 1971, pp. 16-27)
- "Vaginal Construction in Female Children with Absent Vagina and Imperforate Anus" (*ibid.*, 1971, pp. 435-9)
- Ein, S.H., Stephens, C.A. *et al.* "Ulcerative Colitis in Children under One Year of Age. A Twenty-Year Review" (*Journal of Paediatric Surgery*, vol. 6, 1971, pp. 264-71)
- Evans, D.C. and Gertzbein, S. "Femoral Nerve Neuropathy Complicating Iliopsoas Haemorrhage in Patients without Haemophilia" (*Journal of Bone and Joint Surgery*, vol. 54B, 1972, pp. 149-51)
- Falk, R.E. *et al.* "Anti-H1-A2 Cytotoxic Activity in an M Protein" (*Clinical Research*, vol. 19, no. 4, 1971, p. 787)
- "Cellular Reactivity to Streptococcal Antigens in Rheumatic Heart Disease" (*ibid.*, p. 786)
- "HL-A Antigens in Human Transplantation" (*Medical Clinics of North America*, vol. 56, no. 2, 1972, p. 403)
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- "In vitro Assessment of Thymus Cells, Thymoma Cells, and Circulating Lymphocytes in Myasthenia Gravis"; in *Sixth Leukocyte Culture Conference*, ed. M.R. Schwartz, p. 657. Academic Press 1972
- "Leukocyte Migration *in vitro* and its Relationship to Human Renal Allograft Rejection and Enhancement" (*Transplantation*, vol. 13, no. 5, 1972, pp. 461-6)
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- "The Restoration of Immunological Competence in Irradiated Thymectomized Rats with Bone Marrow Cells and Thymus Supernatants"; in *Sixth Leukocyte Culture Conference*, ed. M.R. Schwartz, p. 359. Academic Press 1972
- "The Role of Thymocytes and Thymic Humoral Factors in Restoration of the Immune Response in Rats" (*Clinical Research*, vol. 19, no. 4, 1971, p. 785)
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- "The Tone of the Gastroesophageal Junction: Its Response to Abdominal Compression and its Response to Swallowing" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 328-34)
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- "Biomechanical Studies of Rabbit Tendon" (*Clinical Orthopaedics*, vol. 81, 1971, p. 171)
- "The Blood Supply of the Lumbar Spine" (*Journal of Bone and Joint Surgery*, vol. 53B, 1971, p. 628)
- "Ceramics in Surgery" (*Journal of Biomedical Materials Research Symposium*, vol. 2, part 1, 1971, p. 231)
- "Chemonucleolysis" (*Canadian Journal of Surgery*, vol. 14, 1971, pp. 280-8)
- "The Management of Spondylolisthesis" (*Progress in Neurological Surgery*, vol. 4, 1971, p. 246)
- "Negative Laminectomy" (*Journal of Bone and Joint Surgery*, vol. 53A, 1971, p. 891)
- "The Traction Spur" (*Journal of Bone and Joint Surgery*, vol. 53, 1971, p. 663)
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